2022 Spring Flood Outlook: Red River and Devils Lake Basins

January 28, 2022

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NWS Grand Forks

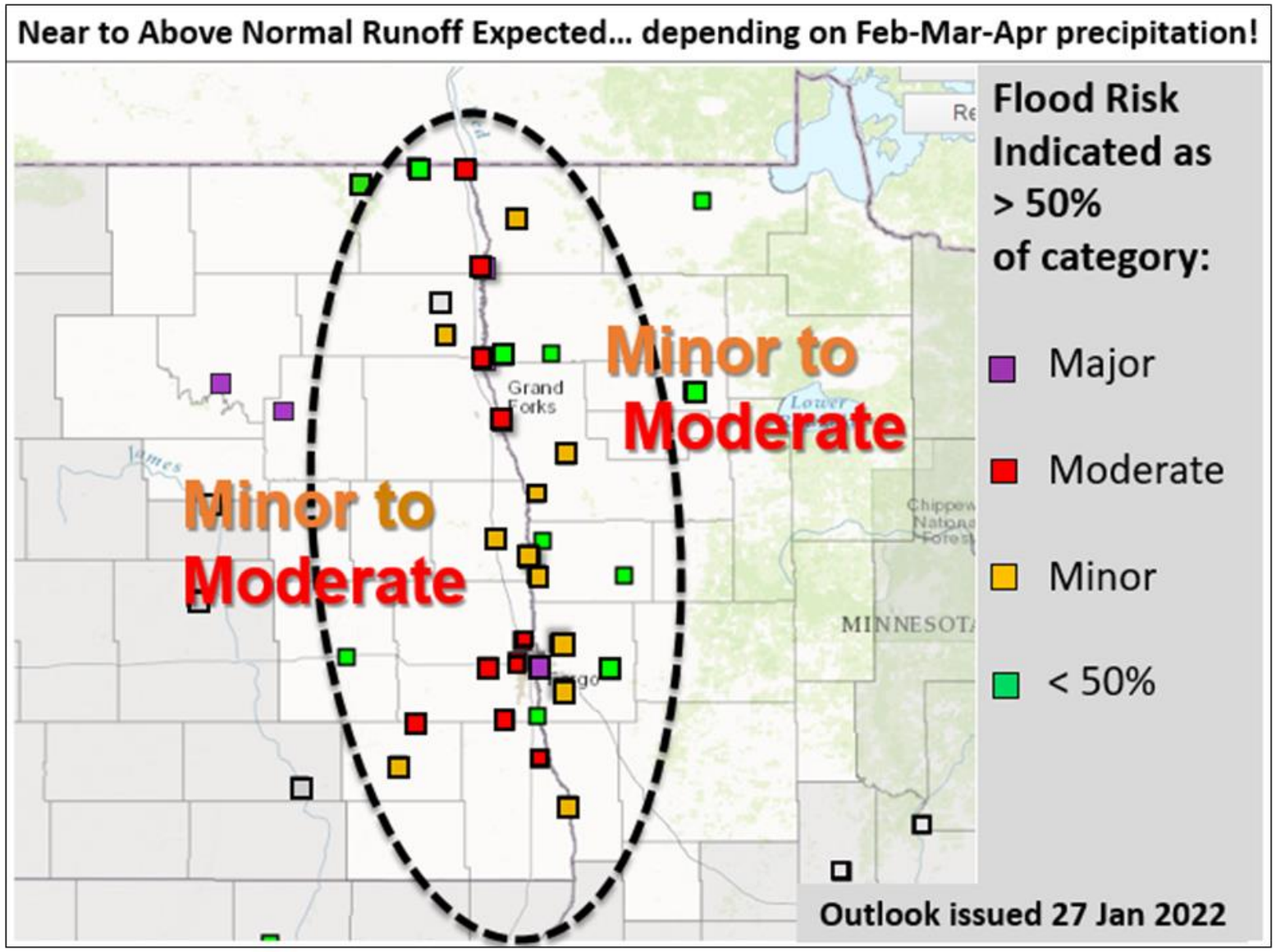
Photo courtesy of Vince Godon

Bottom Line up Front:

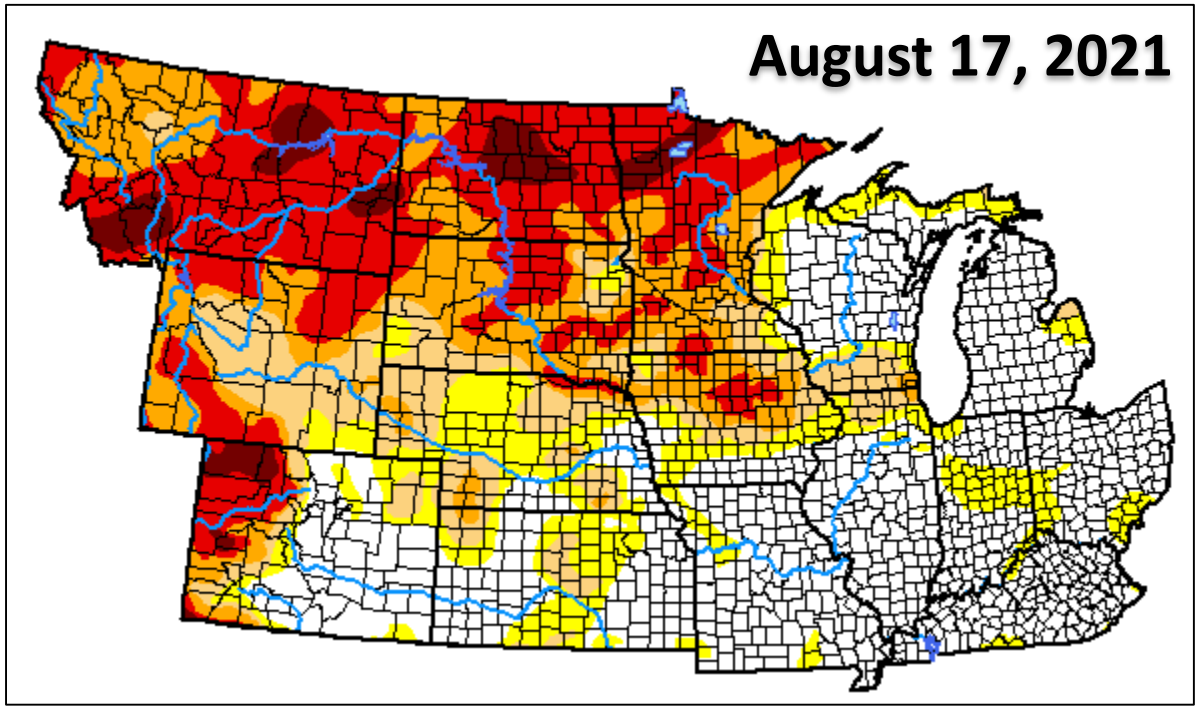
- Risk for ***significant flooding*** is near to slightly higher than historic*.
- ***Minor to moderate flooding*** is the main threat…for now.
  - Dry/drought conditions from 2021 are much improved due to fall precipitation.
  - Soil moisture and base streamflow near normal.
  - Snowpack/snow water content near to slightly above normal.
- February/March/April climate predictions suggest equal chances for below/normal/above temperatures and precipitation (i.e., no strong signal in any direction).

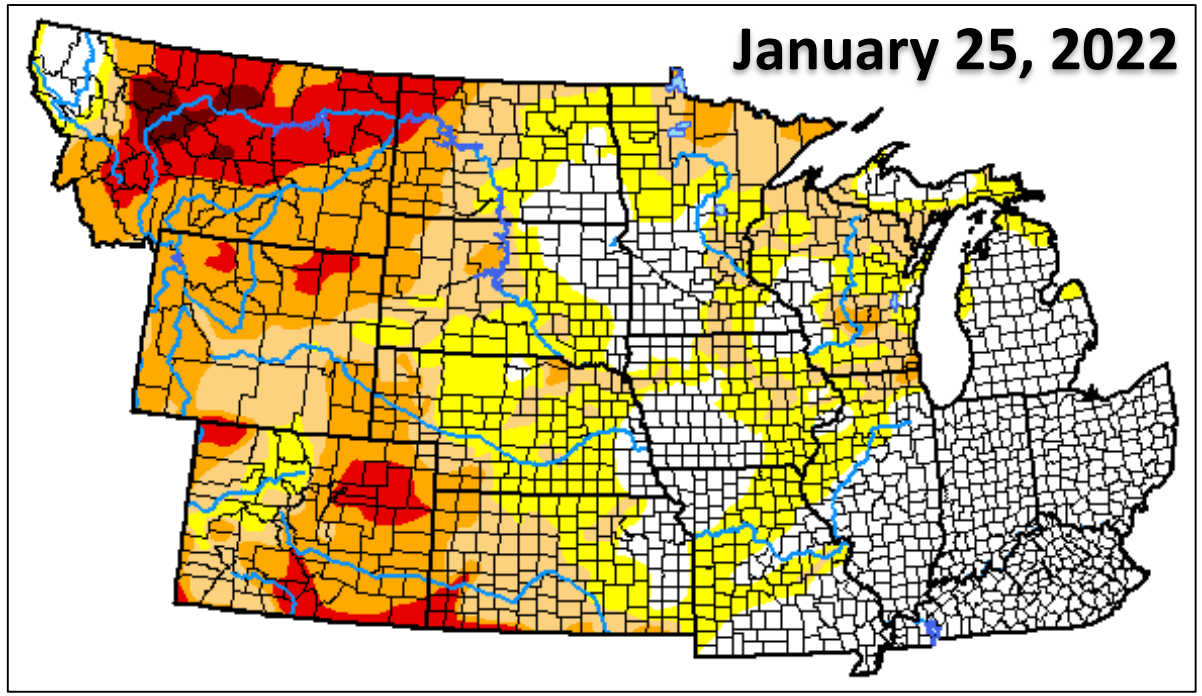
*Refers to Conditional Risk (this year) versus Historical Risk

Flood Risk by Category at River Forecast Points



U.S. Drought Monitor



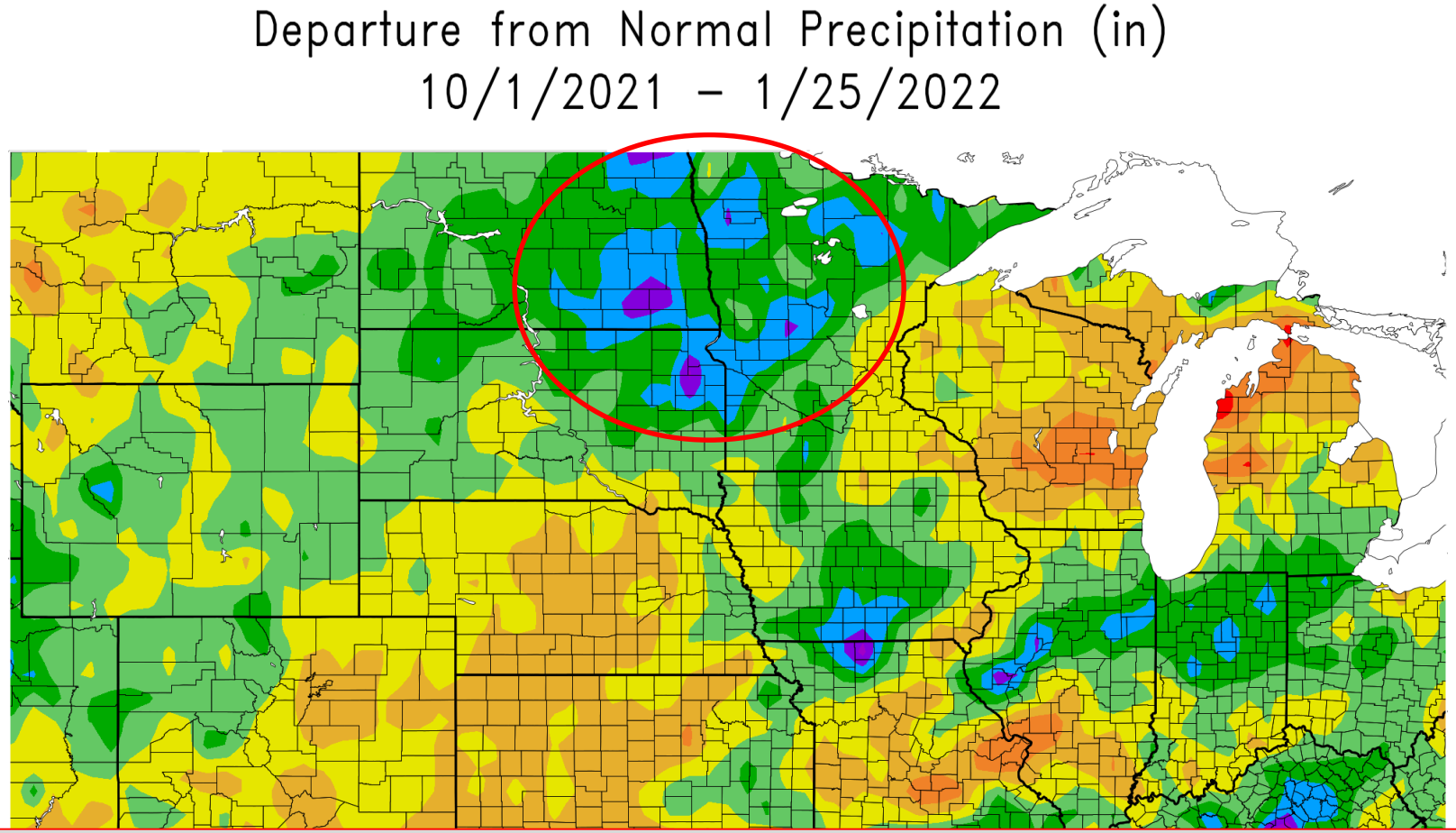


None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

USDA NDMC NOAA

droughtmonitor.unl.edu

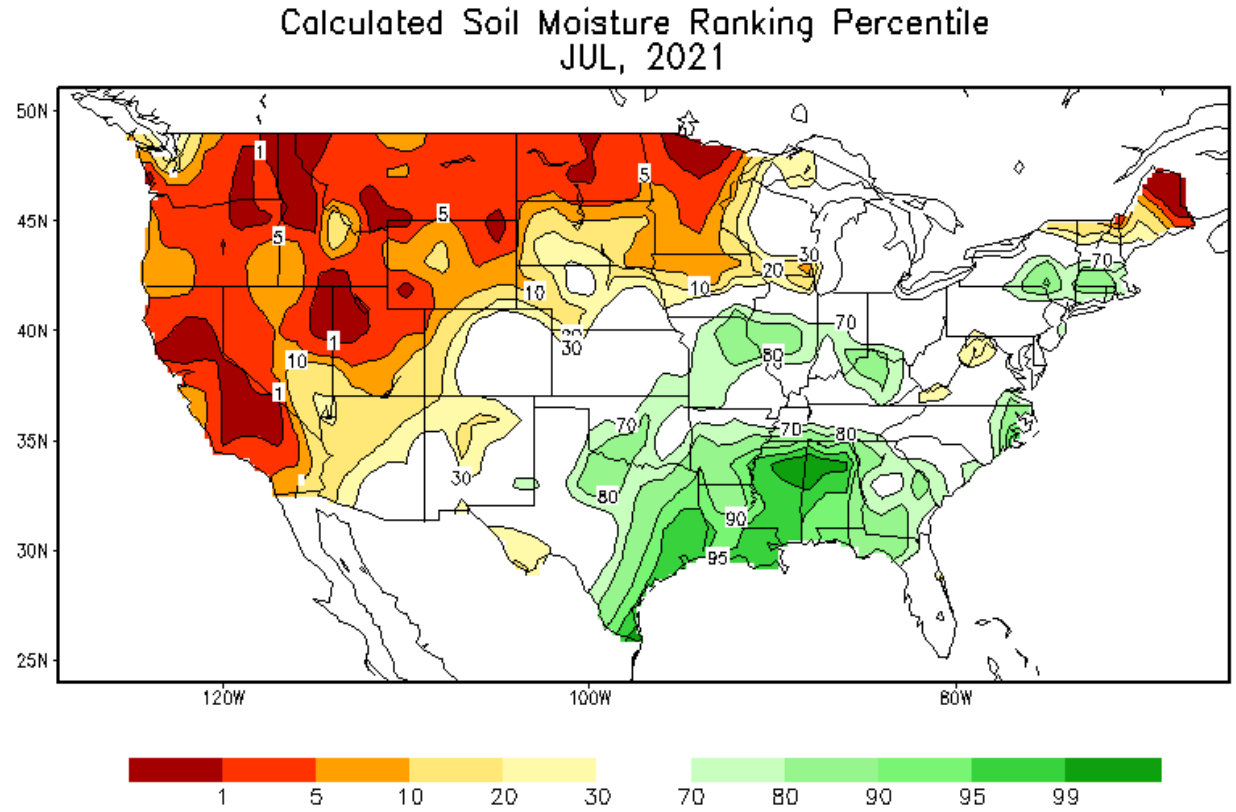
Fall-Winter Precipitation

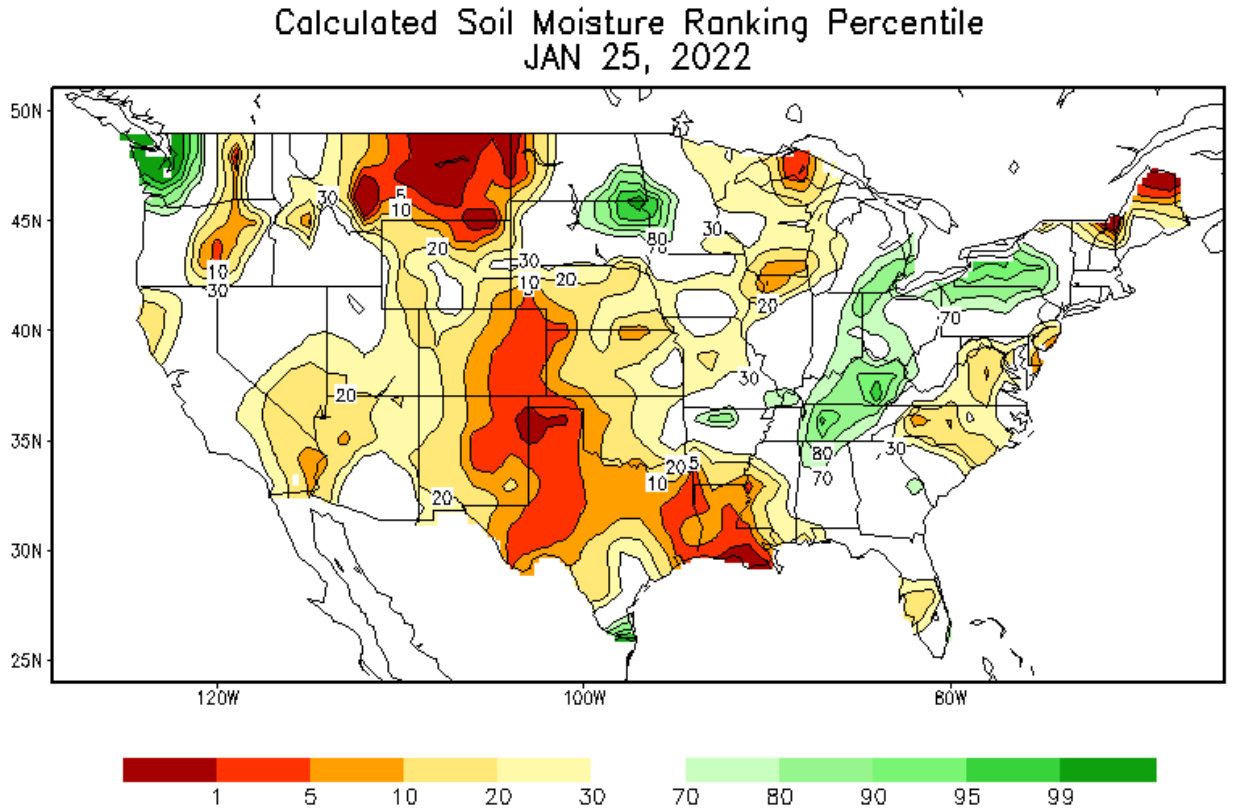


3-6 inches more Fall-Winter precipitation (so far) compared to last year

Summer vs Winter Soil Moisture

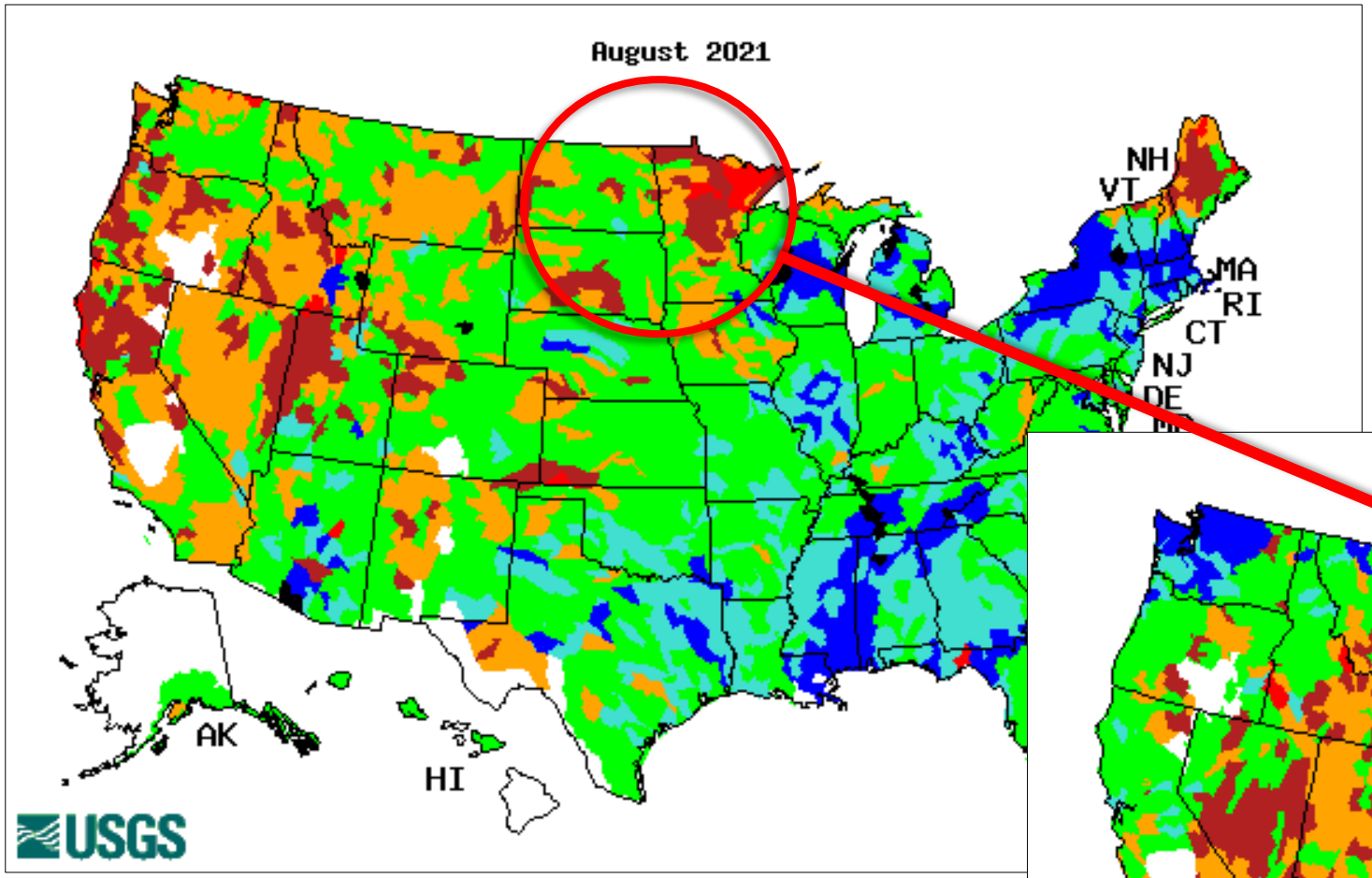
6 Months Ago (July 2021) vs Few Days Ago (January 2022)

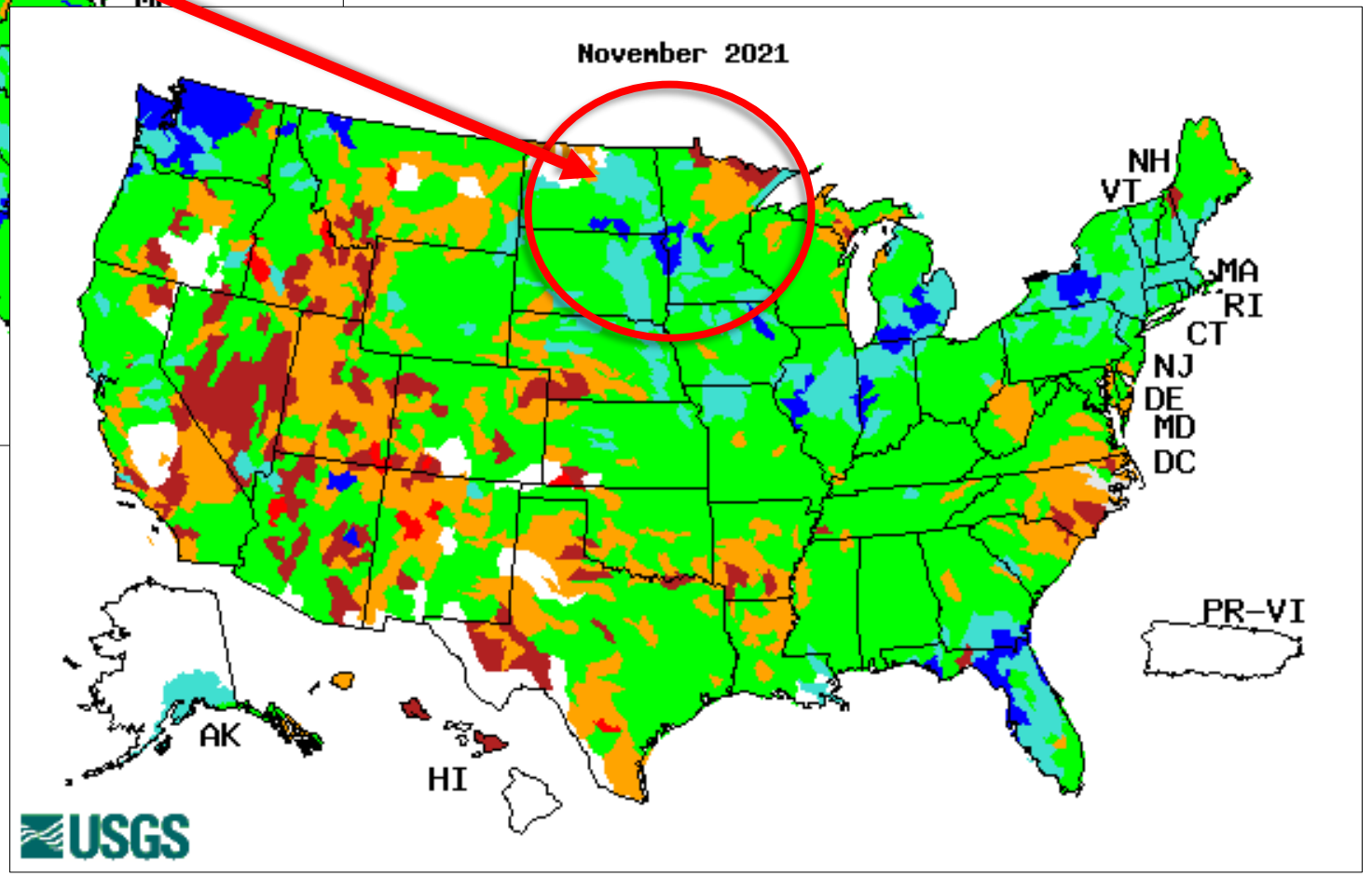




Current NWS/CPC analysis has the basin within +/- 1 inch of normal in top ~3 ft of soil

Much needed fall rains led to near normal streamflow heading into freeze-up





Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

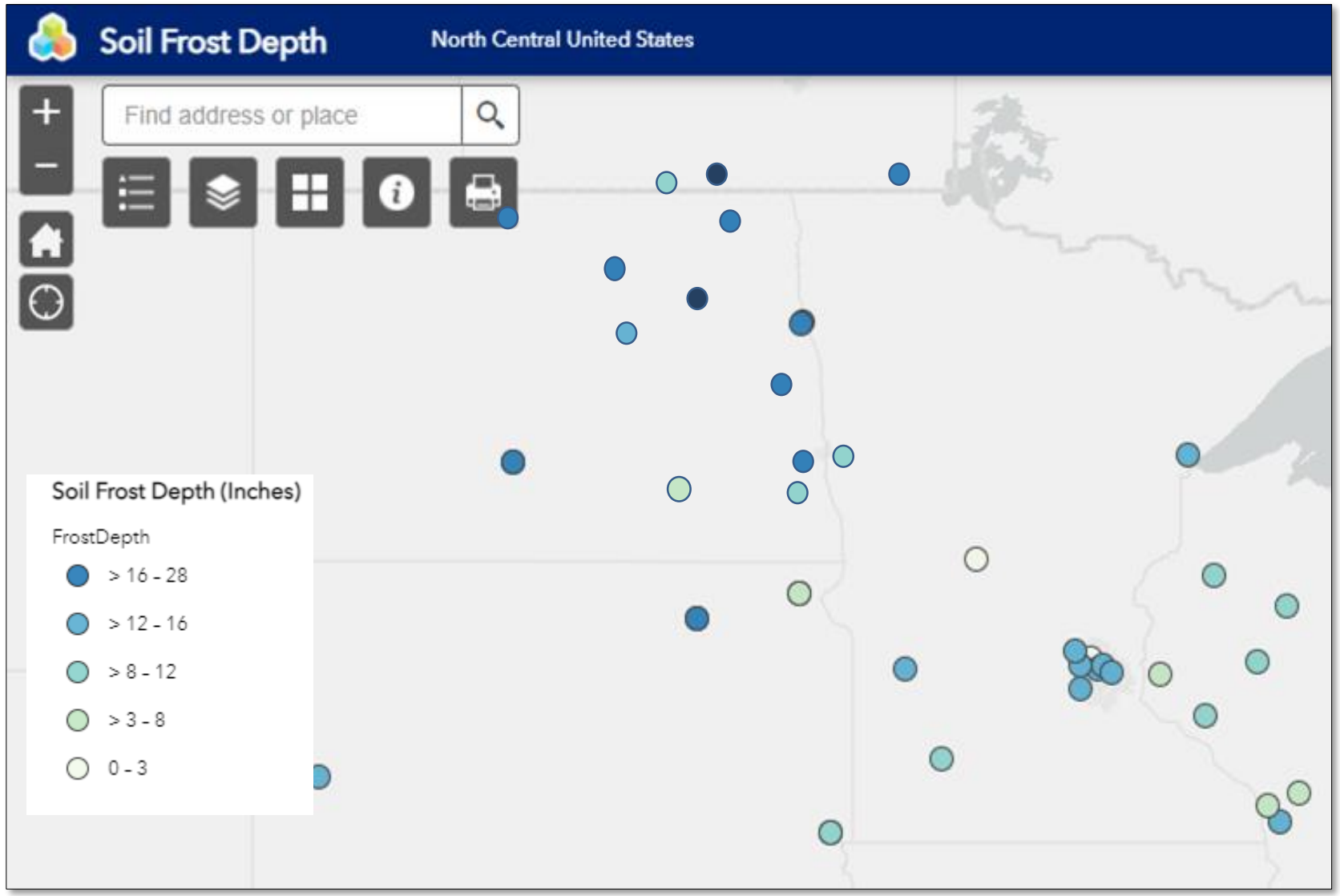
Red River Basin Spring Flood Ingredients

Spring Flooding ??

1. Fall Moisture
2. Base Streamflow
3. Frost Depth
4. Winter Snow Pack
5. Snow Water Content
6. Spring Thaw Cycle
7. Heavy Spring Rains

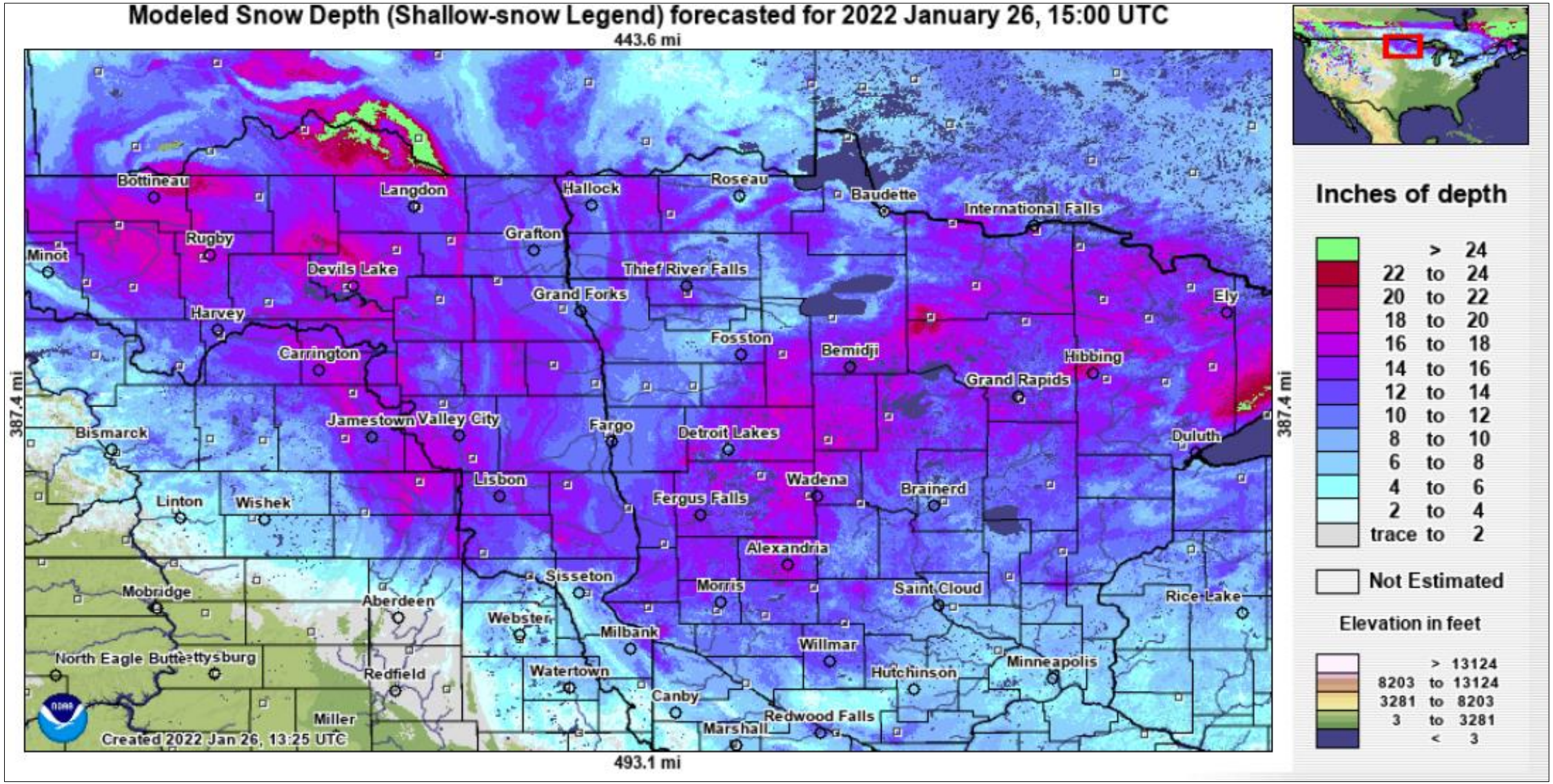
[Bluemle: Factors affecting flooding in the Red River Valley, 1997]

Frost Depths: Near Normal



- Despite the relatively warm start to winter, frost has penetrated fairly deep due to recent cold conditions
- Normal to slightly deeper than normal
  - Generally 12-30 inches
  - Note quite as deep in the far southern valley
  - Currently 27” at NWS Grand Forks

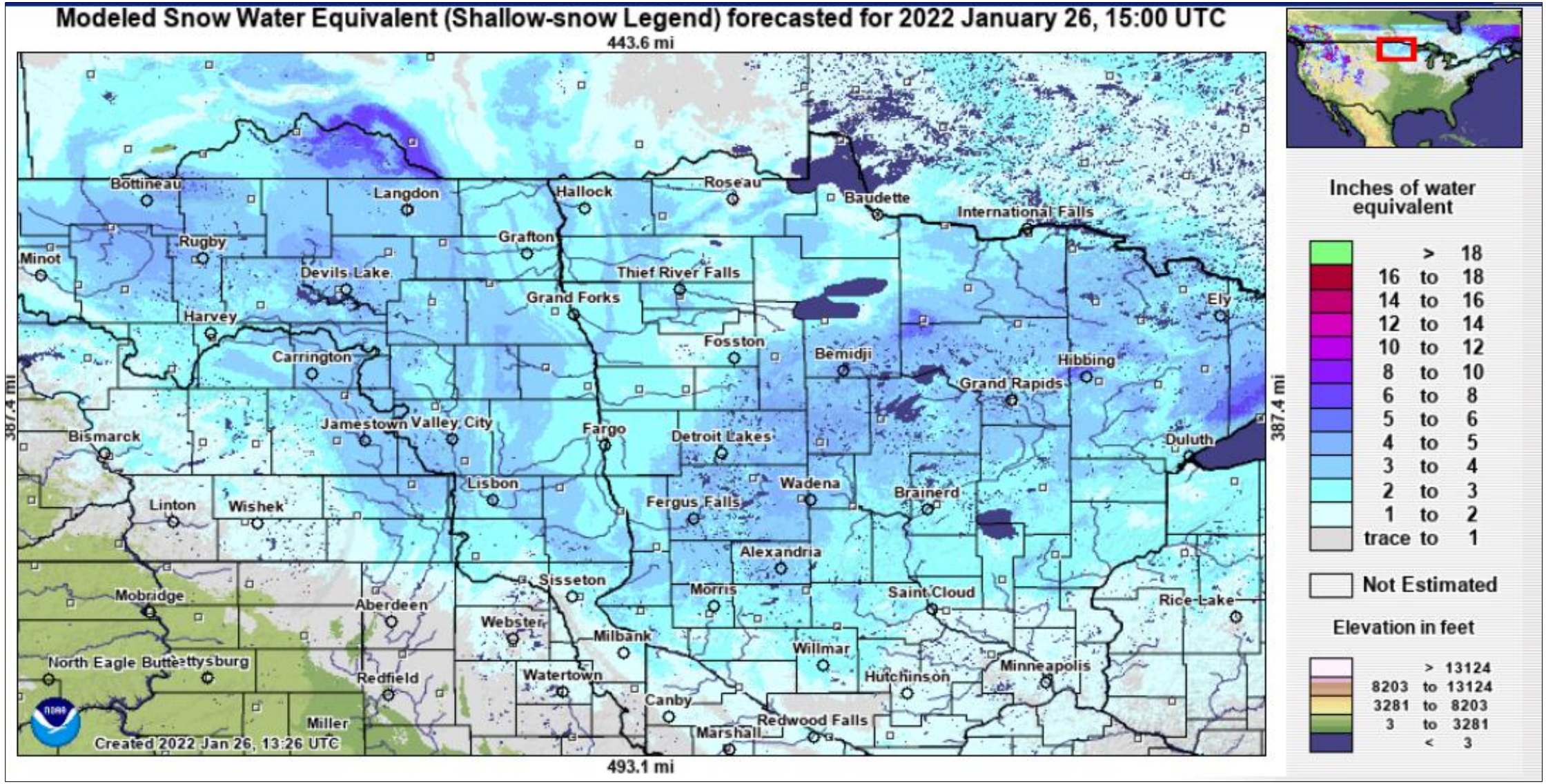
Snow Depth: Near to above Normal



Roughly 6-20” across the basin **NWS Grand Forks: 8”** **Fargo Observer: 11”**

Data courtesy of NOHRSC

Snow Water Content: Near to above Normal



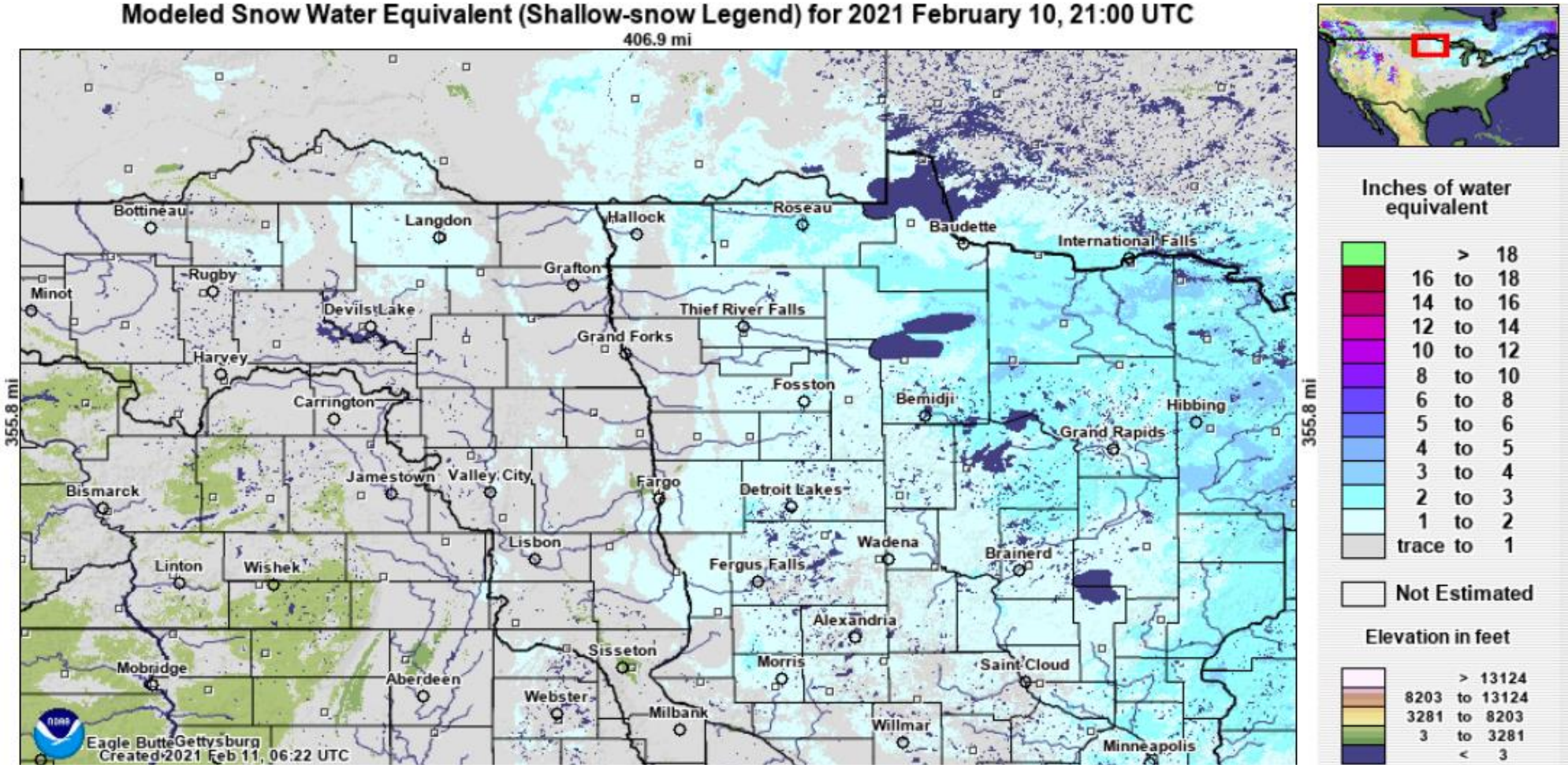
Roughly 1.5-3.5” across the basin

NWS Grand Forks: 2.5”

Data courtesy of NOHRSC

February 11, 2021 Snow Water Content

[well below normal]



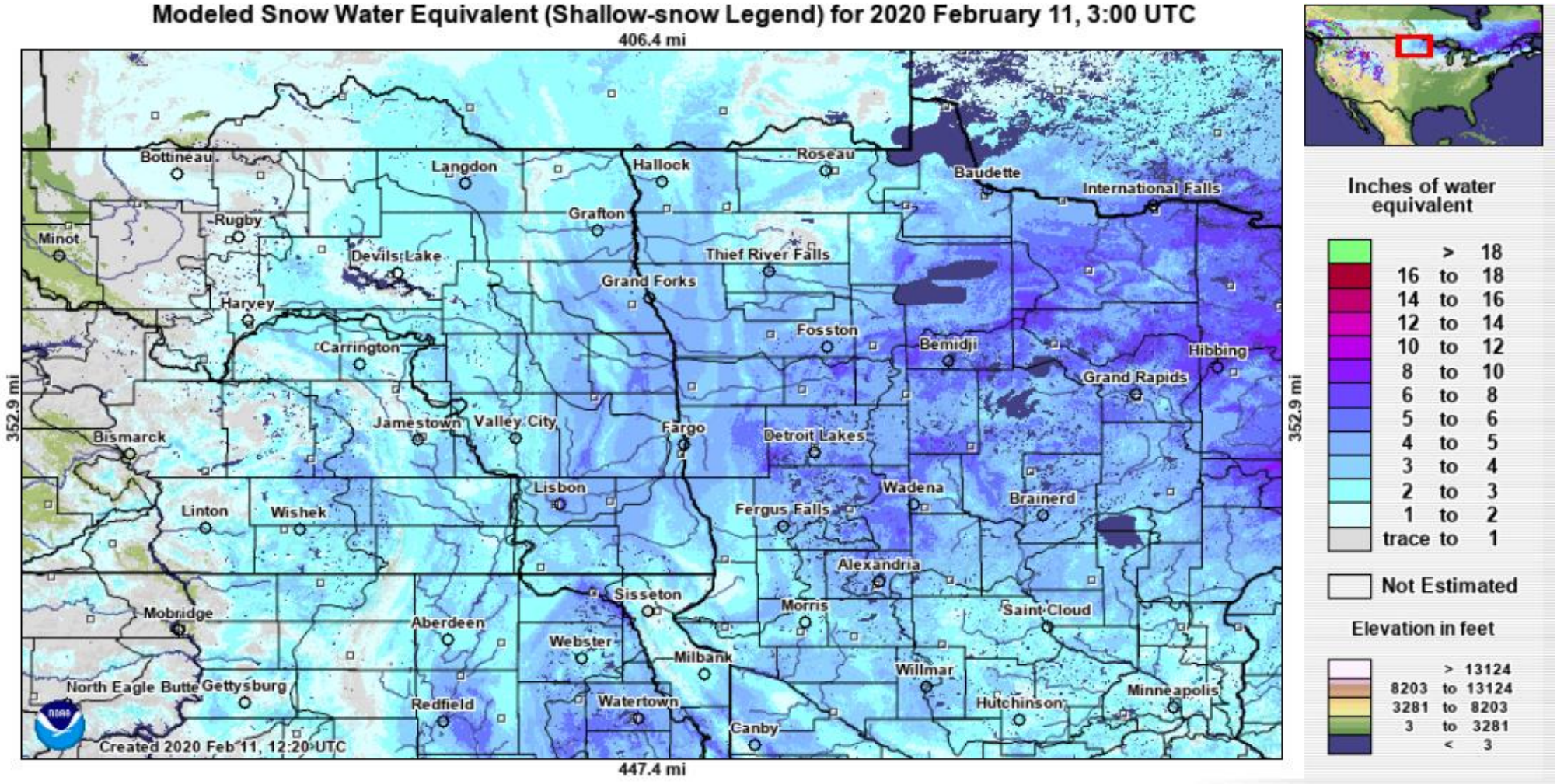
January/February 2021: Snow Depth ranged from 25 to 75 percent of normal across the area…1-4” inches (west/central valley) to 5-10” (east valley).

Very little water content.

Data courtesy of NOHRSC

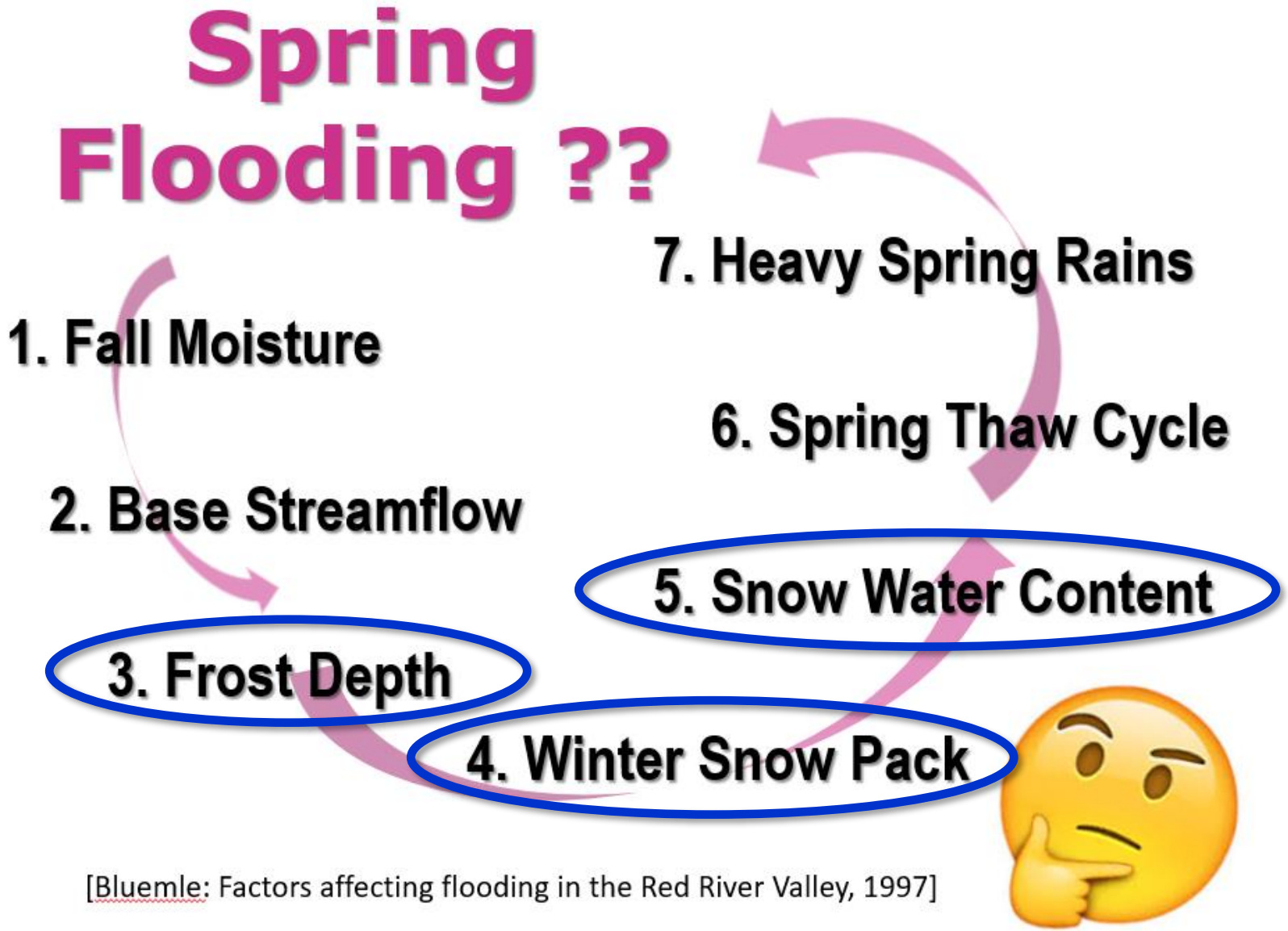
February 11, 2020 Snow Water Content

[generally above to well above normal]



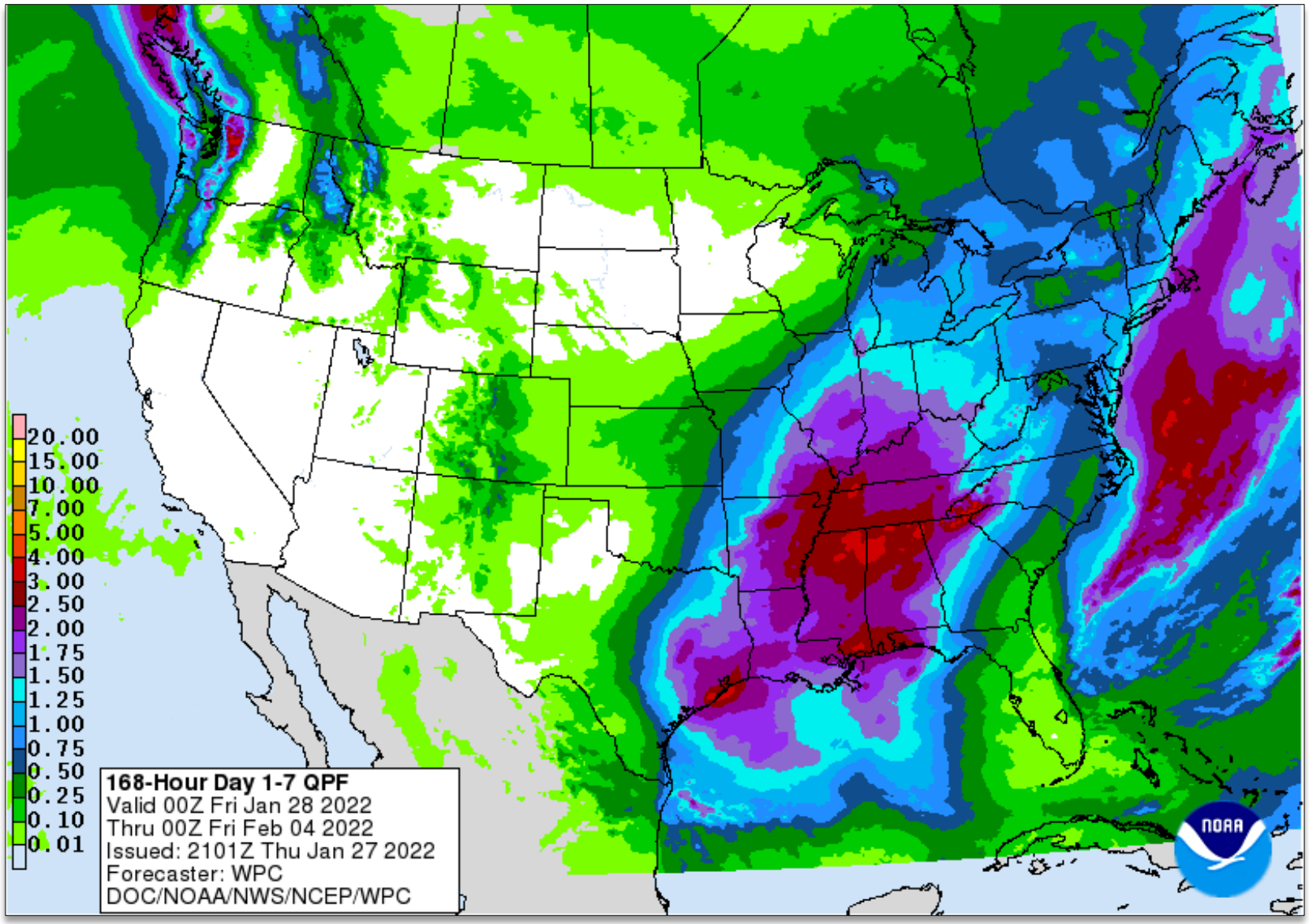
January/February 2020: Snow Depth ranged from 100 to 250 percent of normal across the area. Snow Water Equivalent from 2” (northwest) to 5” (east).

Red River Basin Spring Flood Ingredients

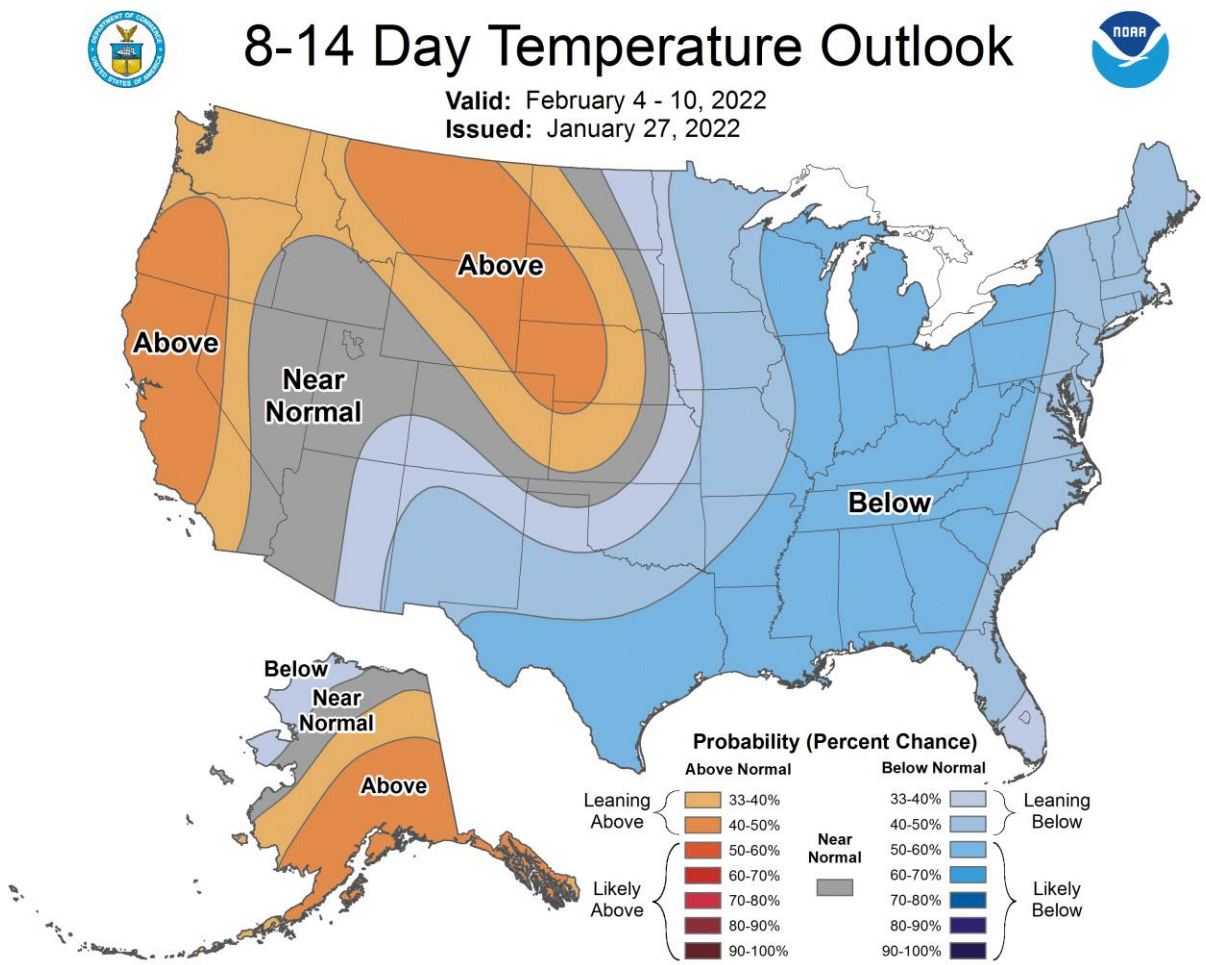


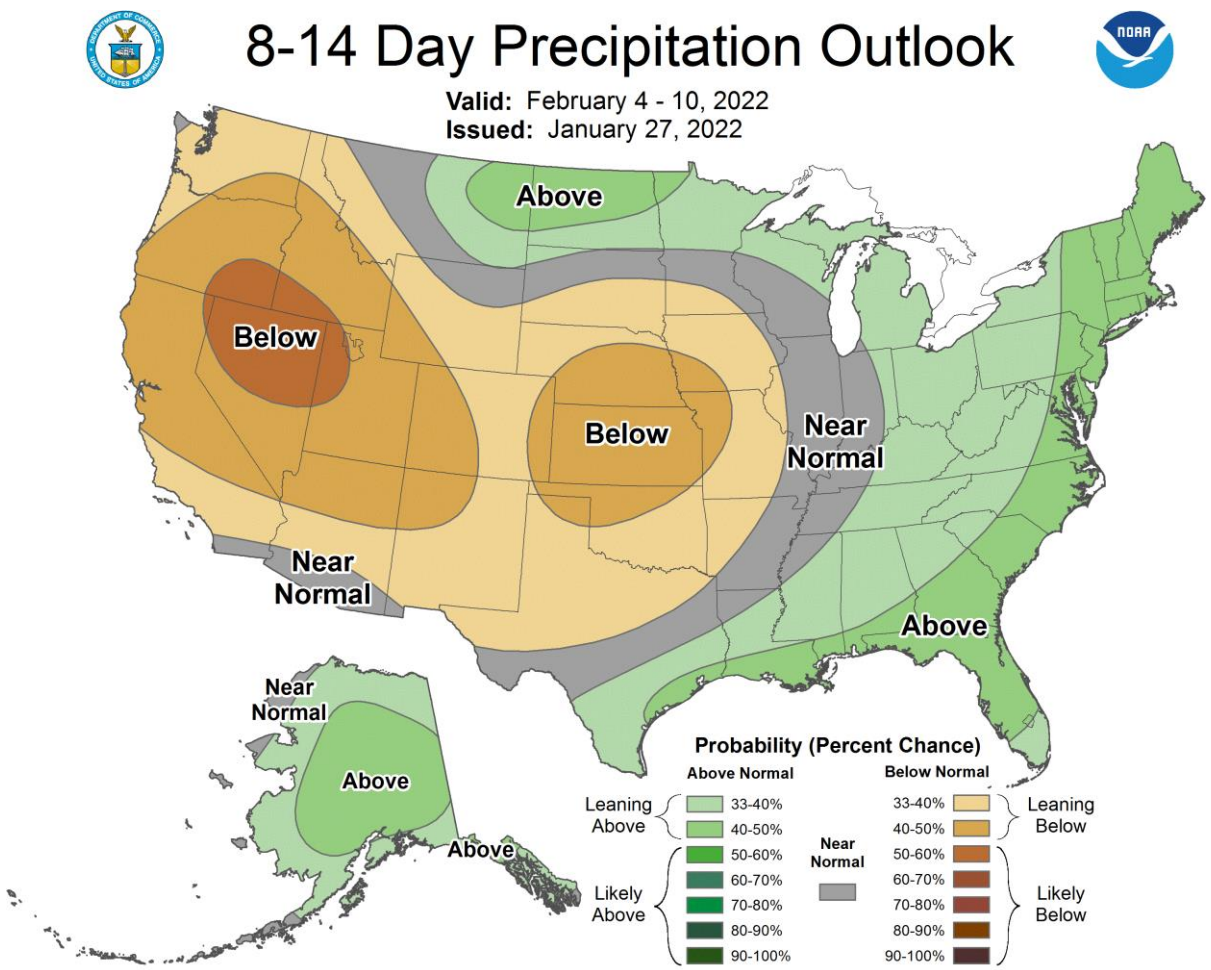
[Bluemle: Factors affecting flooding in the Red River Valley, 1997]

7-Day Forecast Precipitation Forecast (1/28-2/4)



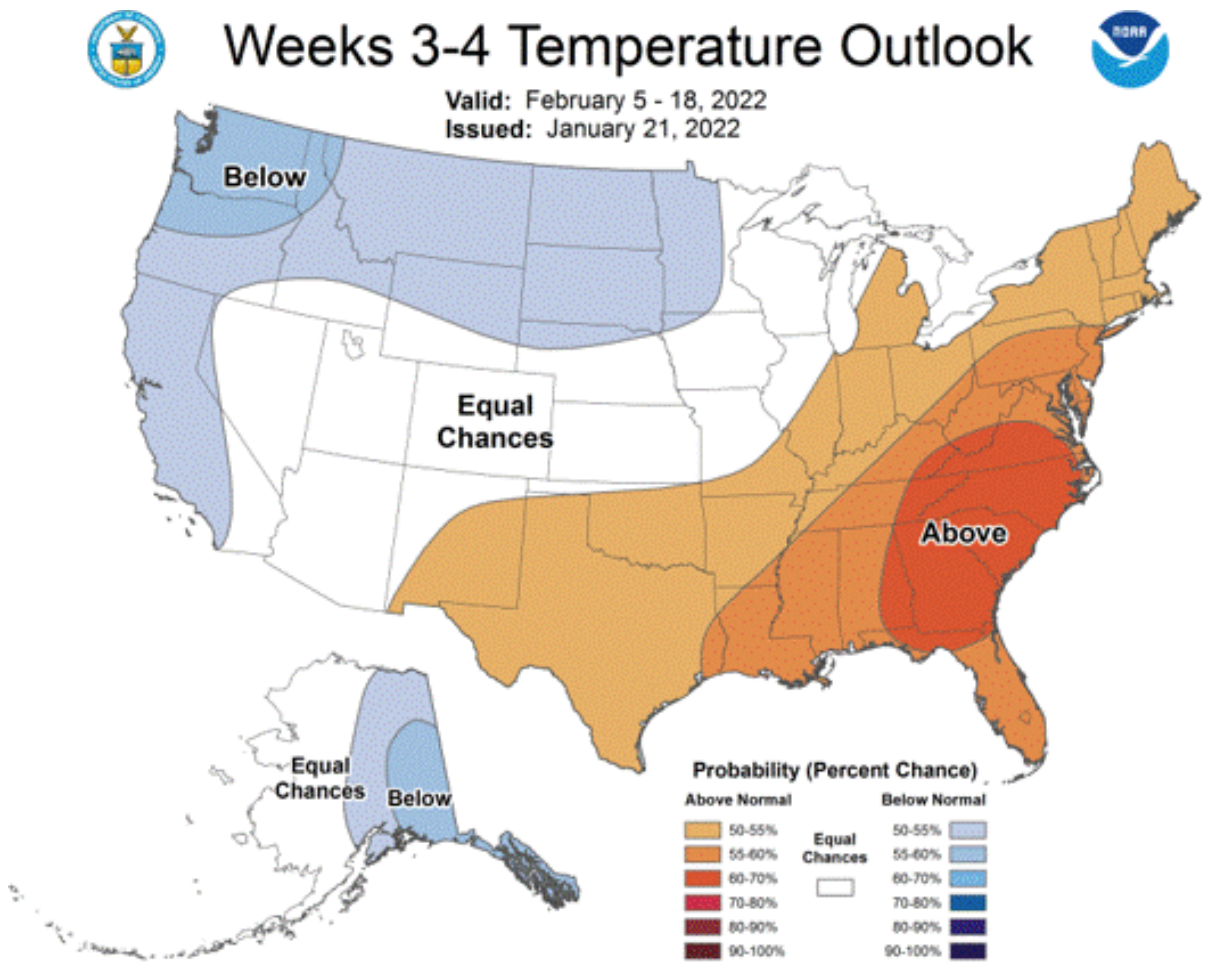
CPC 8-14 Day Outlook

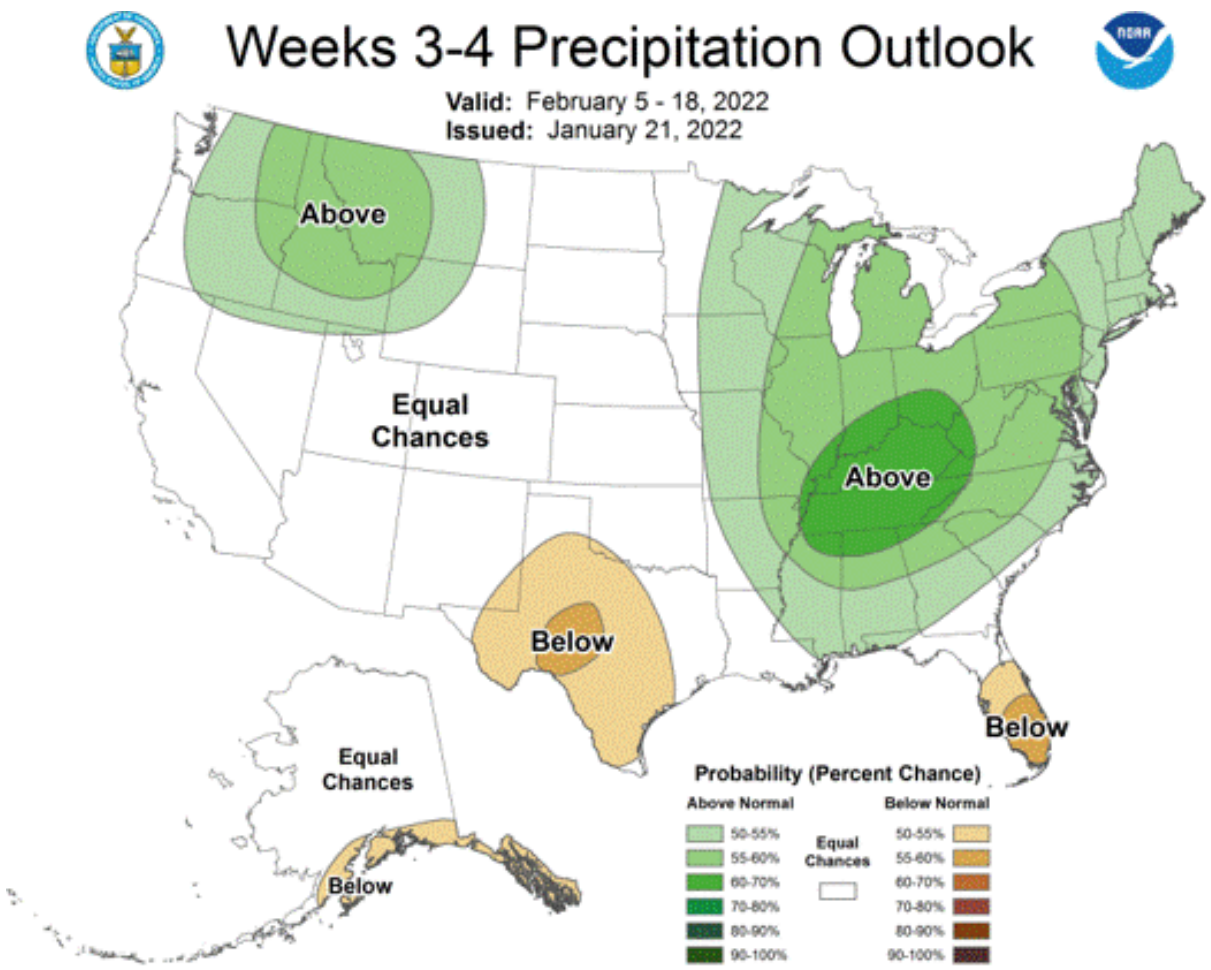




First part of February:
increased chances for below normal temperatures and above normal precipitation.

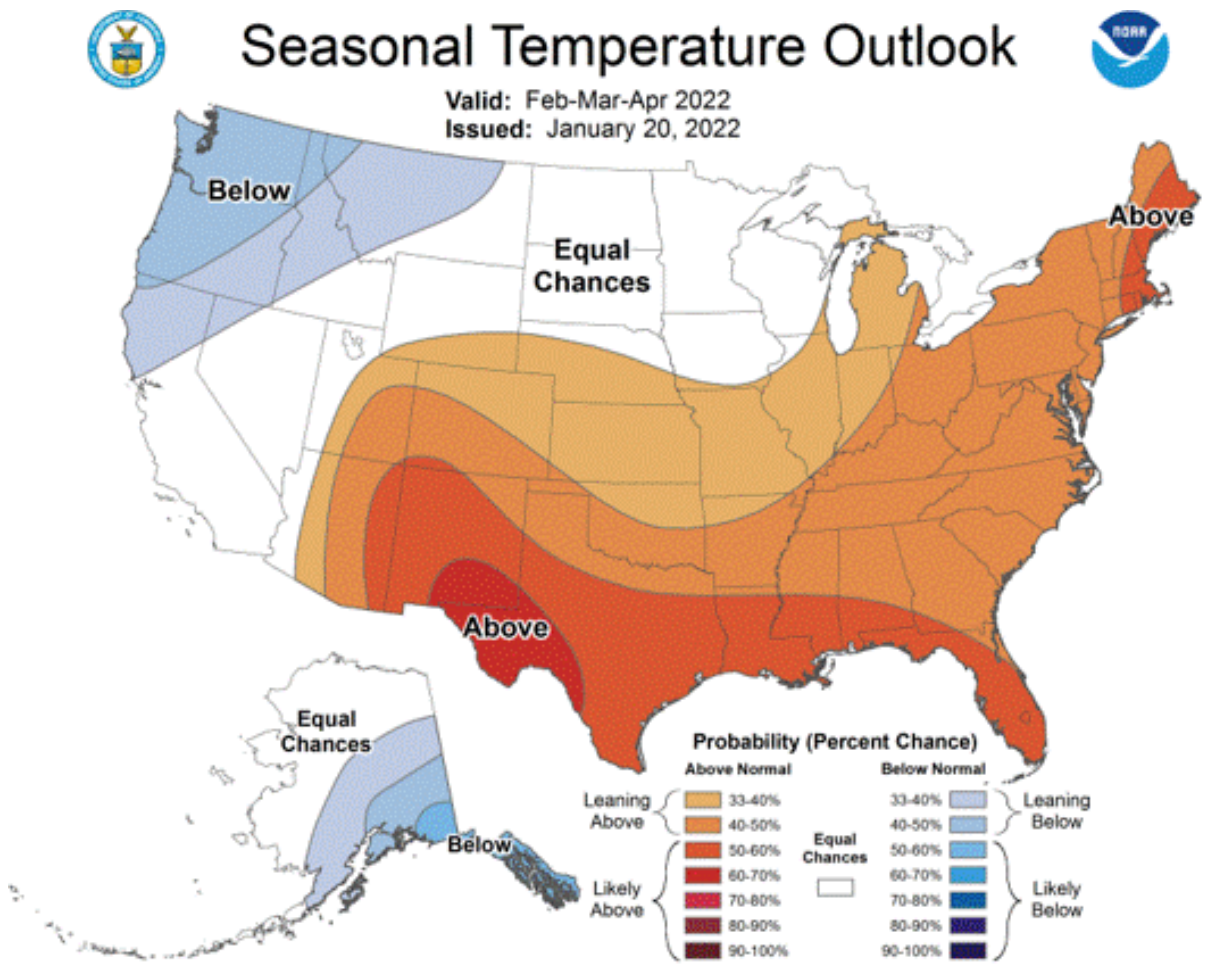
CPC Week 3-4 Outlook

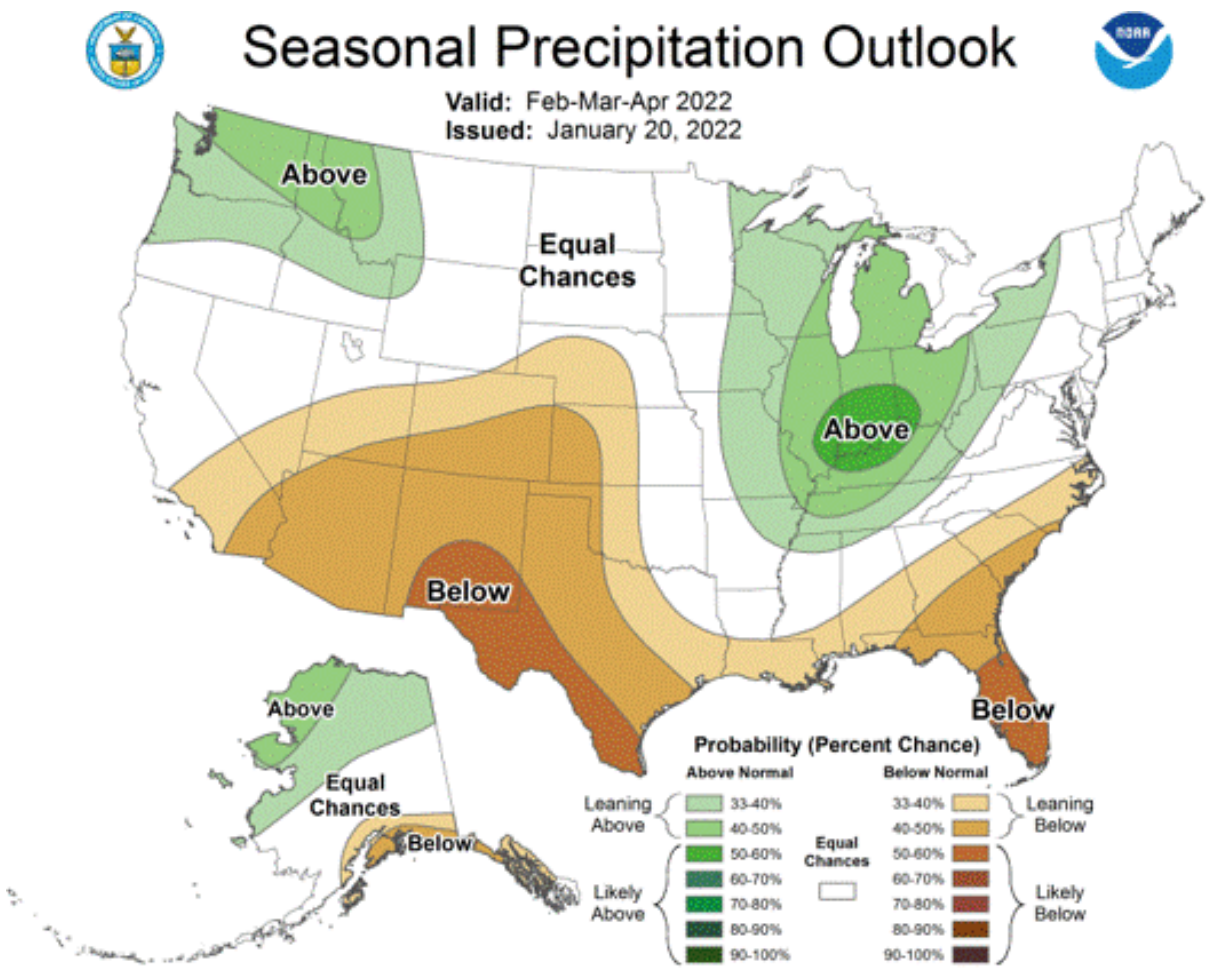




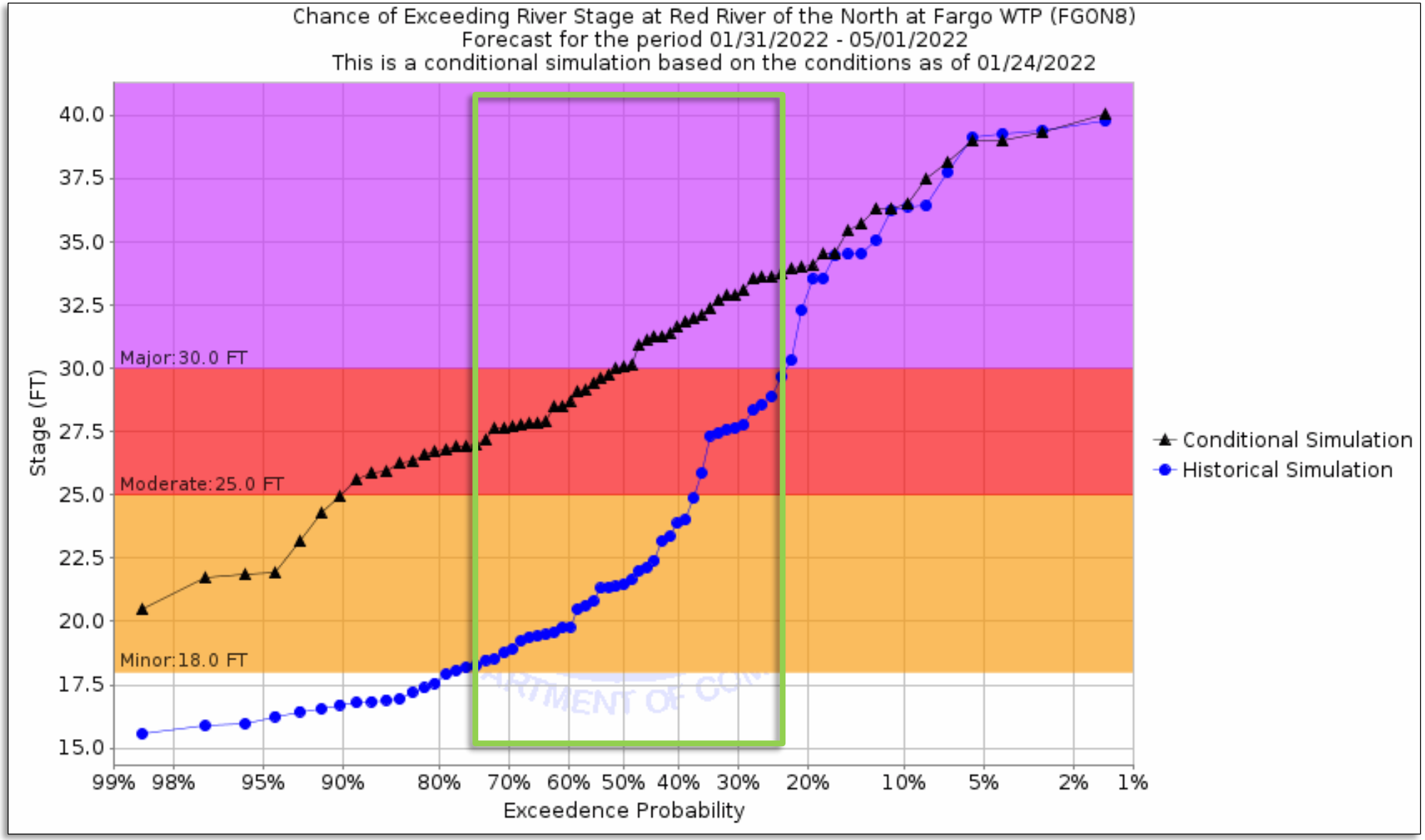
Mid-February: increased chances for below normal temperatures and equal chances for below/normal/above precipitation.

CPC February/March/April Outlook



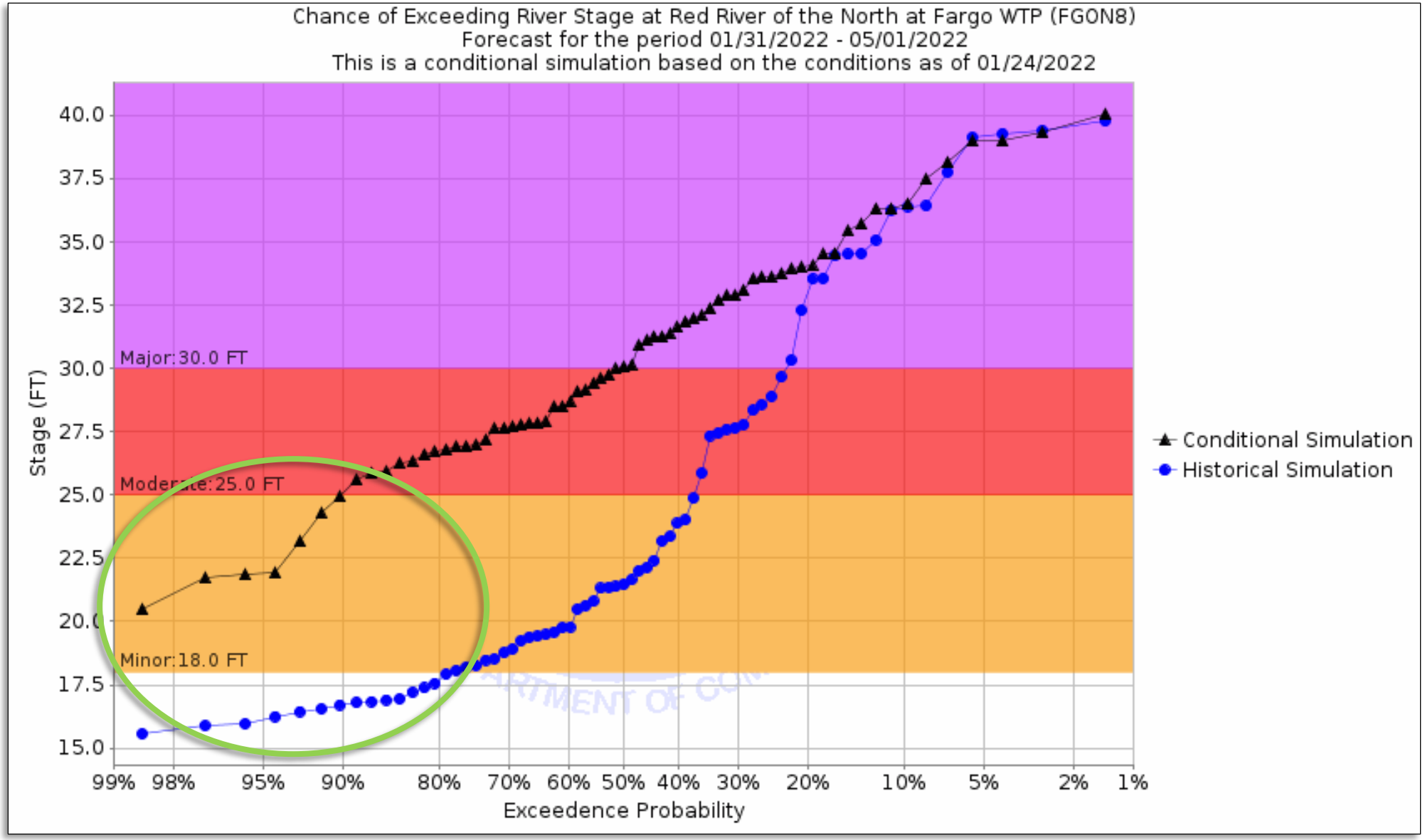


Equal chances for below/normal/above temperatures and below/normal/above precipitation (i.e., no strong signal either way).



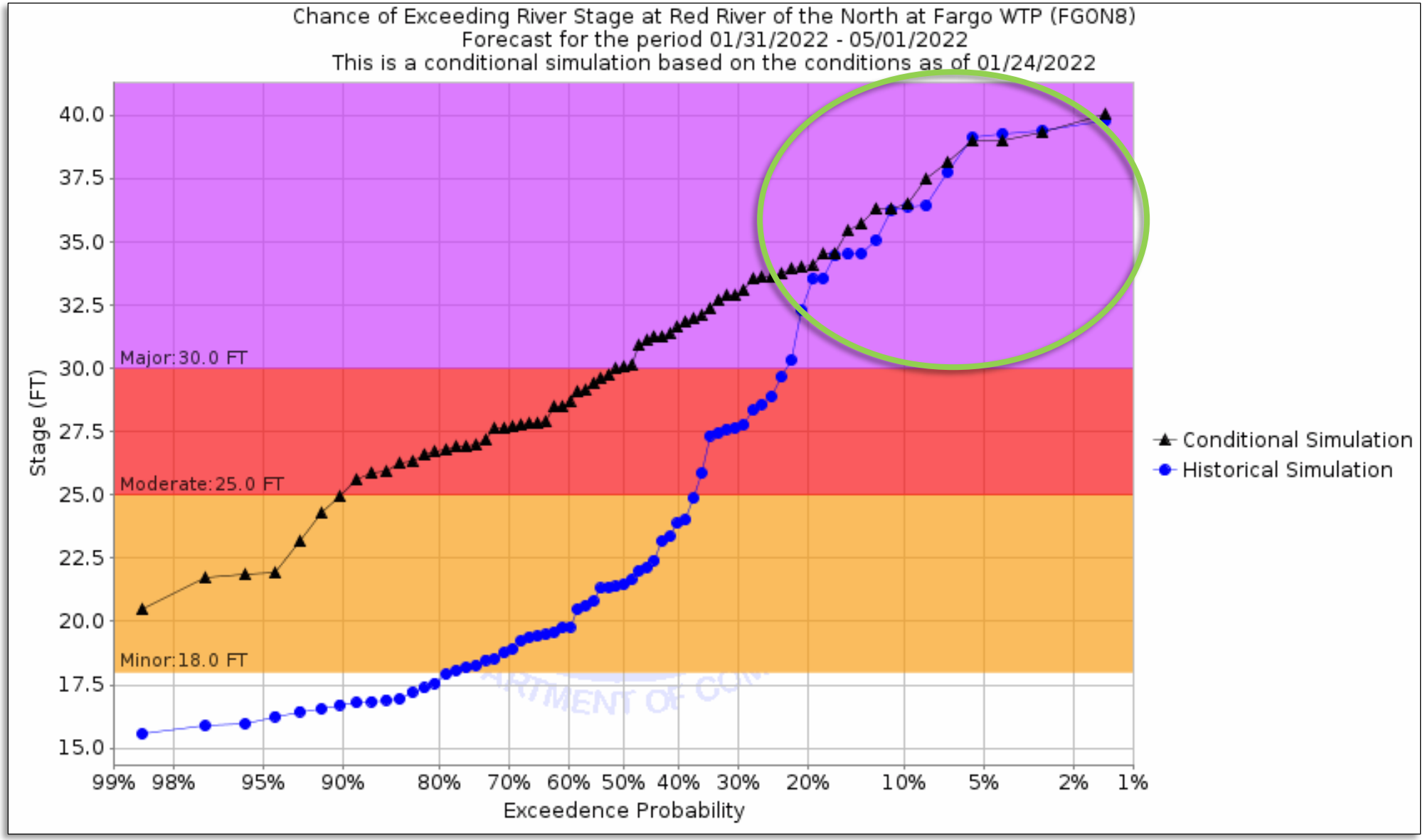
With **near normal temperatures and precipitation** through the rest of winter and into spring, ***moderate*** to ***low end major*** flooding is probable for **Fargo/Moorhead**.

(Not taking into account precipitation type or melt rate.)



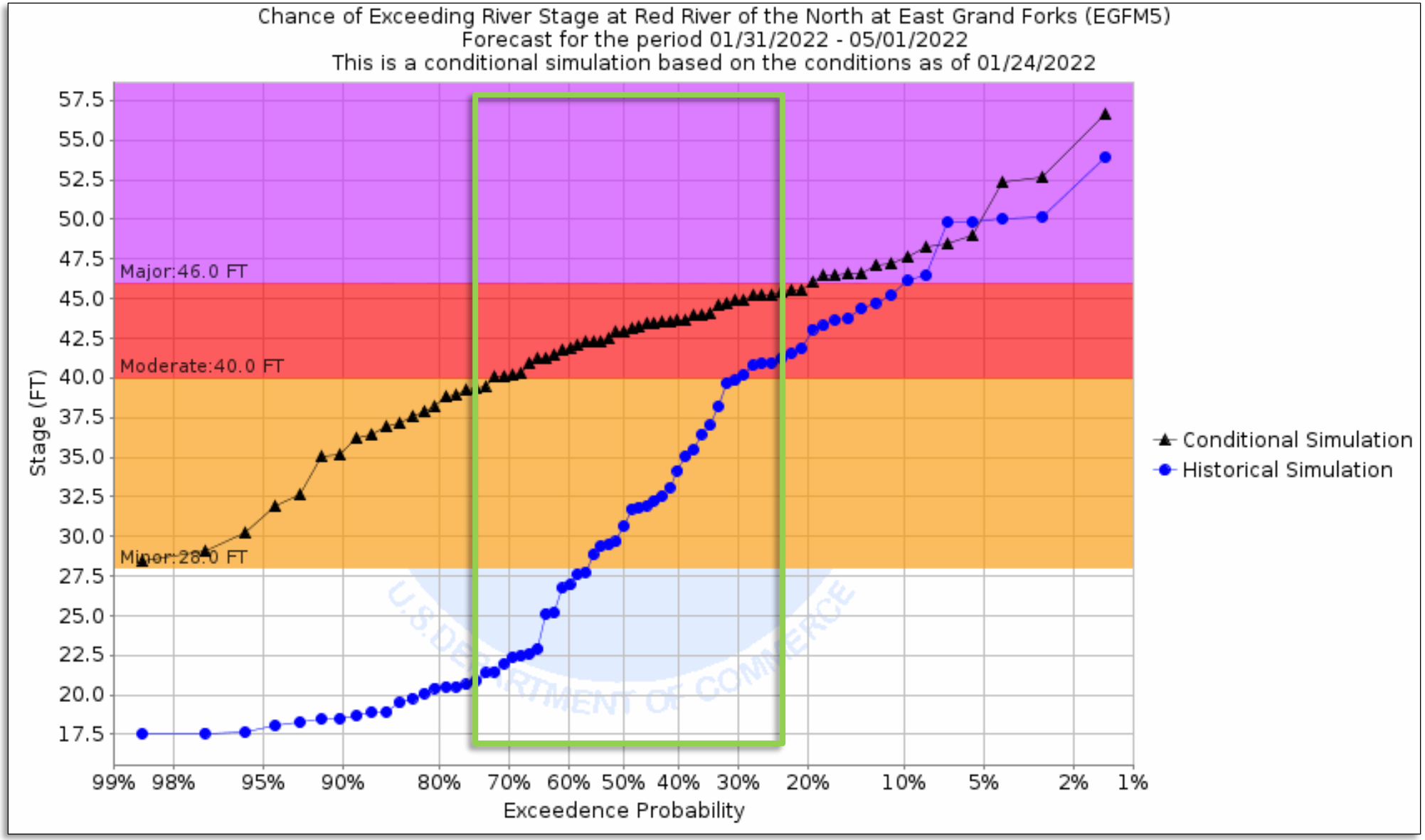
With **mild conditions and little to no additional precipitation** through the rest of winter and into spring, ***minor*** flooding is probable for **Fargo/Moorhead**.

(Not taking into account precipitation type or melt rate.)



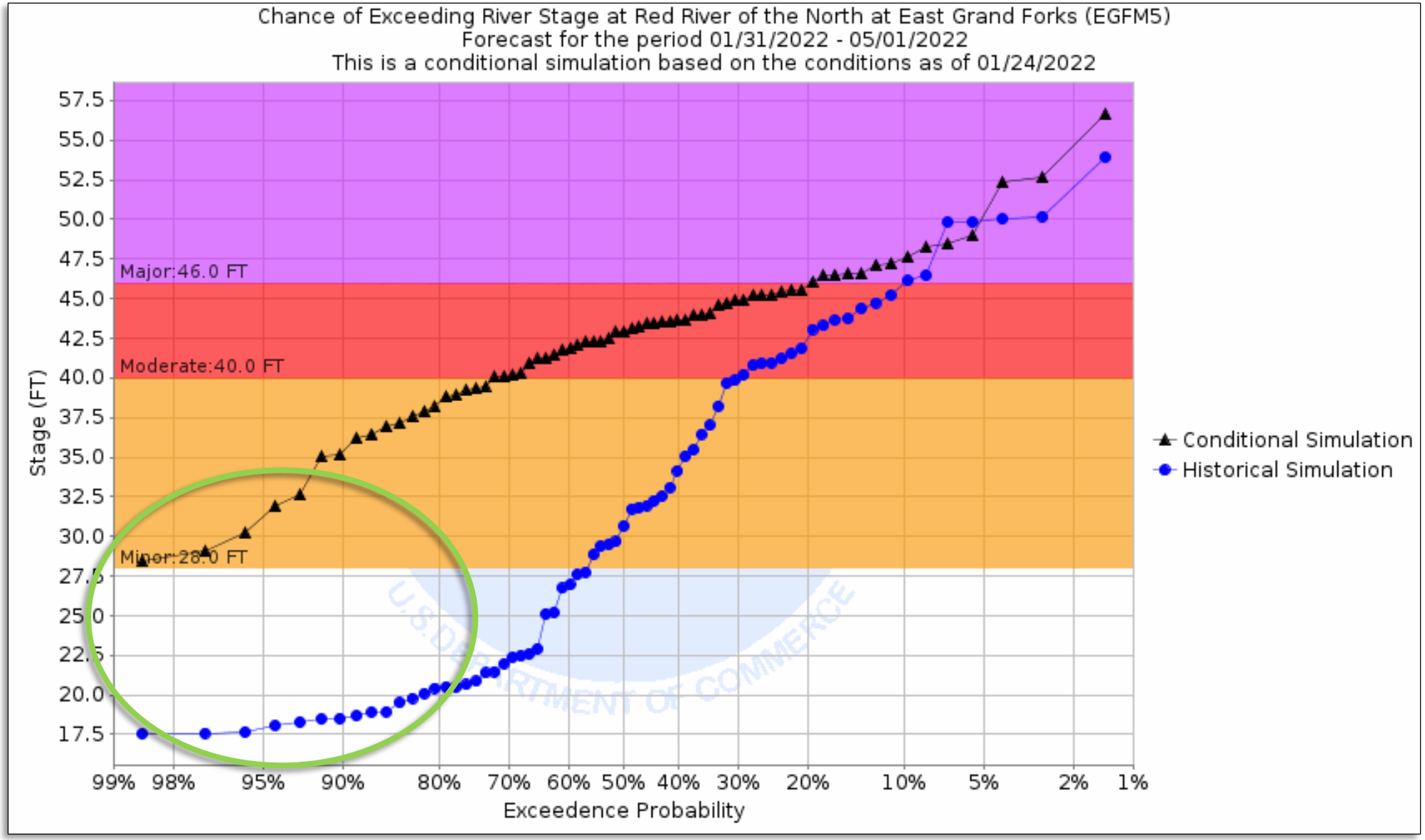
With **cold conditions and significantly above normal precipitation** through the rest of winter and into spring, ***major*** flooding is probable for **Fargo/Moorhead**.

(Not taking into account precipitation type or melt rate.)



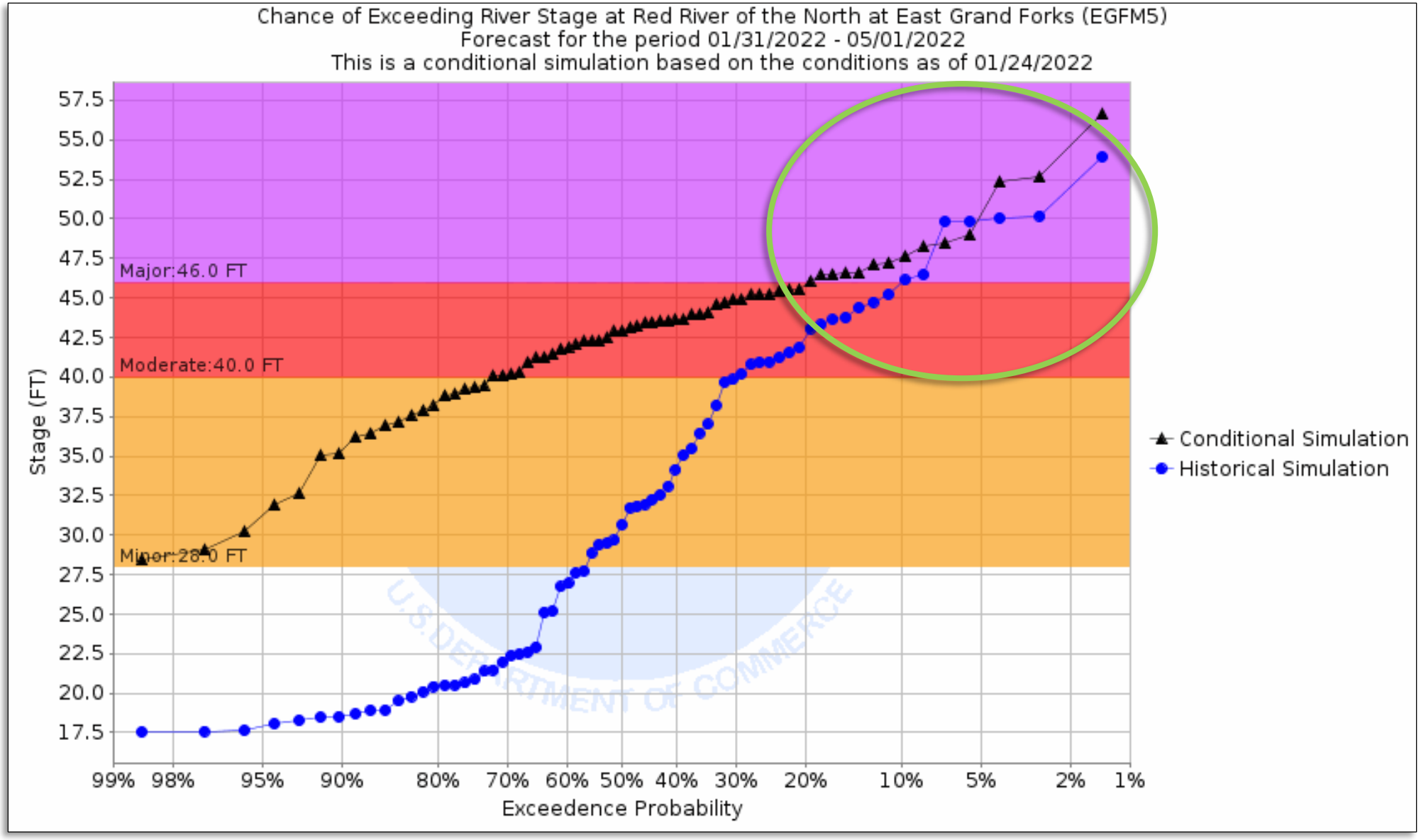
With **near normal temperatures and precipitation** through the rest of winter and into spring, ***moderate*** flooding is probable for **Grand Forks/East Grand Forks**.

(Not taking into account precipitation type or melt rate.)



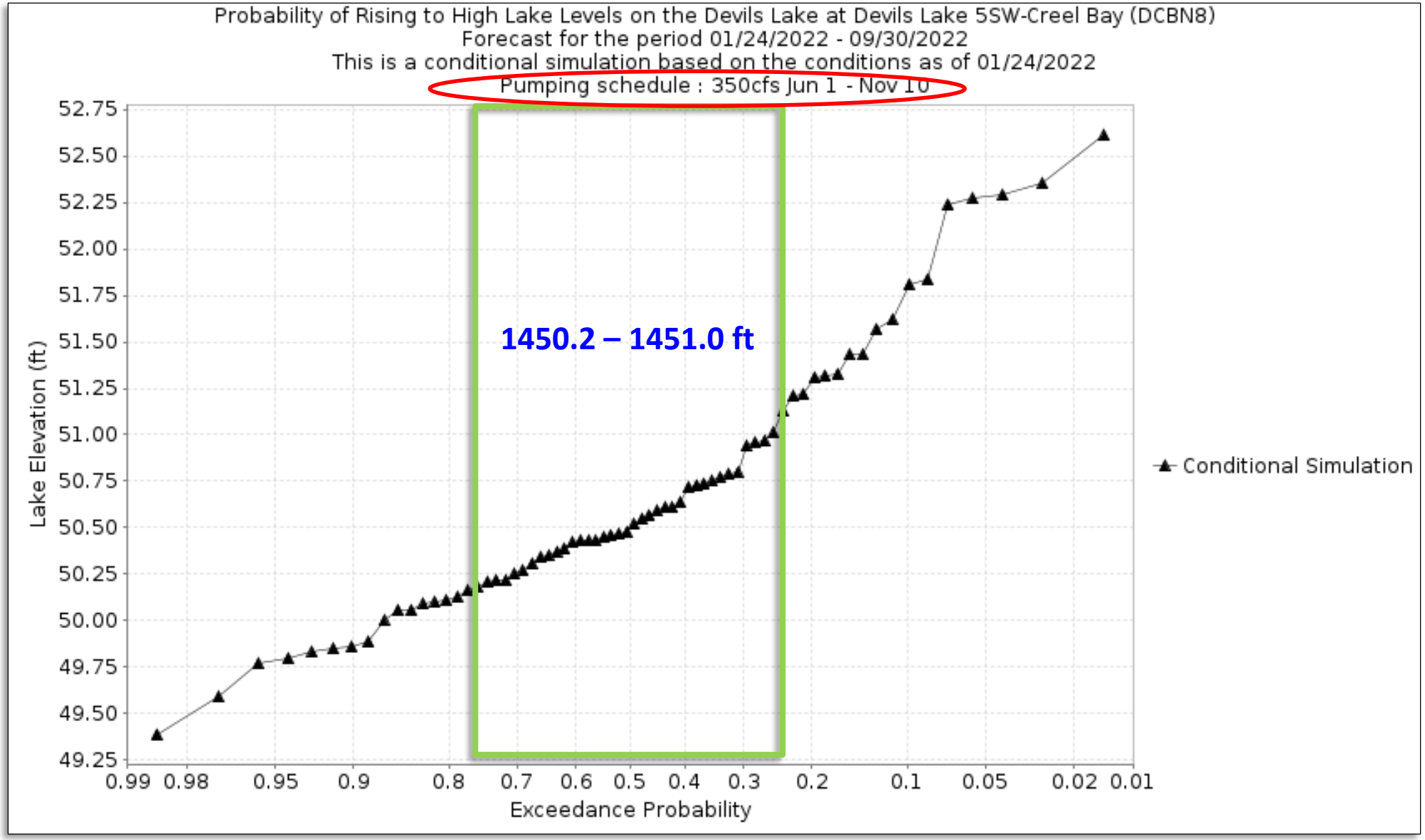
With **mild conditions and little to no additional precipitation** through the rest of winter and into spring, ***minor*** flooding is probable for **Grand Forks/East Grand Forks**.

(Not taking into account precipitation type or melt rate.)



With **cold conditions and significantly above normal precipitation** through the rest of winter and into spring, ***major*** flooding is most probable for **Grand Forks/East Grand Forks**.

(Not taking into account precipitation type or melt rate.)



Current lake level: 1447.19 ft

DEVILS LAKE & STUMP LAKE... Long-Range Probabilistic Outlook
Valid January 24, 2022 - September 30, 2022

LOCATION	95%	90%	75%	50%	25%	10%	05%
CREEL BAY	1449.8	1449.9	1450.2	1450.5	1451.0	1451.8	1452.3
EAST STUMP LAKE	1449.8	1449.9	1450.2	1450.5	1451.0	1451.8	1452.3

The current heights of Devils Lake and Stump Lake are ~1447.28 ft. MSL.

Color code: Below Minor Moderate Major *Flood of Record*

RED RIVER AND TRIBUTARIES... Long-Range Probabilistic Outlook
Valid January 31, 2022 - May 01, 2022

LOCATION	95%	90%	75%	50%	25%	10%	05%
WAHPETON	11.2	11.7	11.9	12.6	14.3	16.0	16.4
HICKSON	22.6	24.8	26.8	28.3	32.6	34.9	36.0
FARGO	21.9	25.1	27.0	30.1	33.6	36.5	39.0
HALSTAD	22.4	24.0	27.8	31.2	35.5	38.6	39.3
GRAND FORKS	31.2	35.4	39.3	42.9	45.2	47.6	50.3
OSLO	31.5	33.7	34.5	35.7	36.7	37.8	38.8
DRAYTON	30.5	34.0	38.2	40.5	41.8	42.5	43.4
PEMBINA	36.9	41.6	45.8	48.8	51.0	52.2	52.7
Minnesota Tributaries:							
South Fork Buffalo River.....							
SABIN	13.1	13.9	14.2	14.8	15.5	16.4	17.9
Buffalo River.....							
HAWLEY	5.5	5.9	6.8	7.5	9.0	9.6	10.7
DILWORTH	14.4	16.6	17.4	19.3	21.2	22.6	24.2
Wild Rice River.....							

PEMBINA	36.9	41.6	45.8	48.8	51.0	52.2	52.7
Minnesota Tributaries:							
South Fork Buffalo River.....							
SABIN	13.1	13.9	14.2	14.8	15.5	16.4	17.9
Buffalo River.....							
HAWLEY	5.5	5.9	6.8	7.5	9.0	9.6	10.7
DILWORTH	14.4	16.6	17.4	19.3	21.2	22.6	24.2
Wild Rice River.....							
TWIN VALLEY	5.3	5.4	5.8	7.1	8.3	9.3	10.7
HENDRUM	18.7	20.4	23.3	26.9	29.6	31.5	32.3
Marsh River.....							
SHELLY	8.3	9.0	10.3	11.4	14.4	16.6	18.5
Sand Hill River.....							
CLIMAX	11.9	14.5	17.0	21.5	25.5	29.4	31.6
Red Lake River.....							
HIGH LANDING	4.8	5.6	6.7	8.2	9.8	11.5	11.8
CROOKSTON	12.5	13.9	15.1	18.8	21.1	23.8	29.0
Snake River.....							
ABOVE WARREN	63.4	63.5	63.8	64.4	65.4	66.2	67.0
ALVARADO	100.7	100.9	101.5	103.6	106.0	108.1	108.5
Two Rivers River.....							
HALLOCK	800.8	801.6	802.4	804.9	807.3	808.6	809.1
Roseau River.....							
ROSEAU	10.0	10.1	11.1	12.4	14.3	16.5	17.2
North Dakota Tributaries:							
Wild Rice River.....							
ABERCROMBIE	7.6	11.6	13.8	16.4	19.9	23.6	25.2

ALVARADO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Two Rivers River.....							
HALLOCK	800.8	801.6	802.4	804.9	807.3	808.6	809.1
Roseau River.....							
ROSEAU	10.0	10.1	11.1	12.4	14.3	16.5	17.2
North Dakota Tributaries:							
Wild Rice River.....							
ABERCROMBIE	7.6	11.6	13.8	16.4	19.9	23.6	25.2
Sheyenne River.....							
VALLEY CITY	11.6	12.1	13.0	14.1	18.6	20.6	22.4
LISBON	11.7	12.5	13.9	15.4	19.0	22.1	23.4
KINDRED	14.7	16.0	17.9	20.0	21.1	21.2	21.2
WEST FARGO DVRSN	15.1	15.9	17.2	19.4	21.3	21.3	21.3
HARWOOD	82.0	82.9	87.1	90.7	91.4	92.1	92.1
Maple River.....							
ENDERLIN	10.3	11.5	12.1	12.7	13.5	14.4	15.4
MAPLETON	17.9	19.2	20.3	21.6	22.3	23.4	23.7
Goose River.....							
HILLSBORO	7.6	9.0	12.0	13.8	14.7	15.6	16.3
Forest River.....							
MINTO	4.4	5.0	5.3	6.3	7.1	7.5	7.6
Park River.....							
GRAFTON*	-.-	-.-	-.-	-.-	-.-	-.-	-.-
Pembina River.....							
WALHALLA	4.6	5.2	6.0	7.3	9.4	11.6	12.8
NECHE	8.7	9.5	10.6	13.3	17.9	20.1	21.2

PFOS: Probabilistic Flood Outlook Summary

- Same probabilistic data, just in a different format
- Includes all Red River mainstem and tributary forecast points

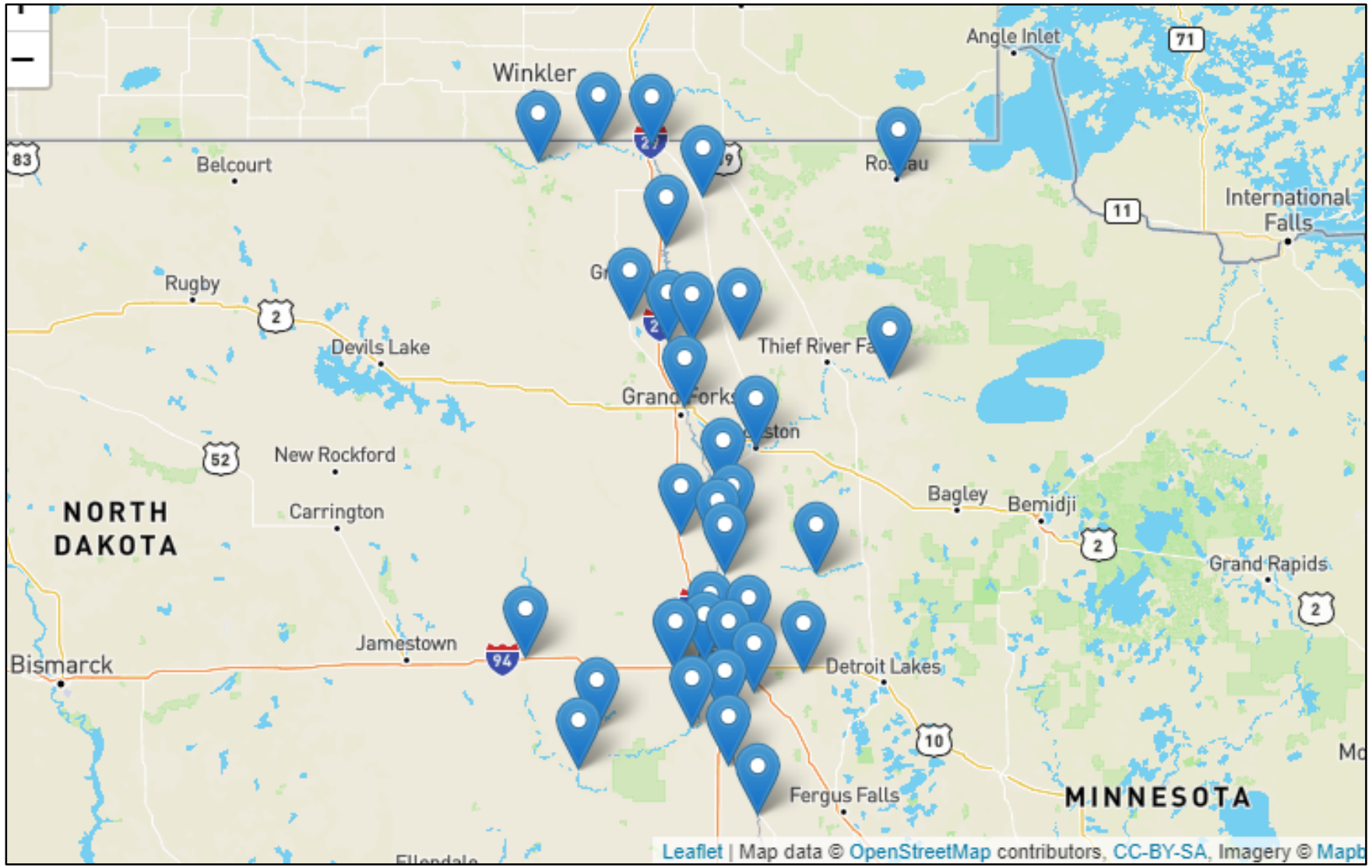
At a glance, relates current risk to:

- flood categories
- recent crests
- floods of record

Remains an experimental product so feedback is critical to keep it going!

Use the map below to view forecast point PFOS Graphics

(click a site marker below, then click on the image to expand)



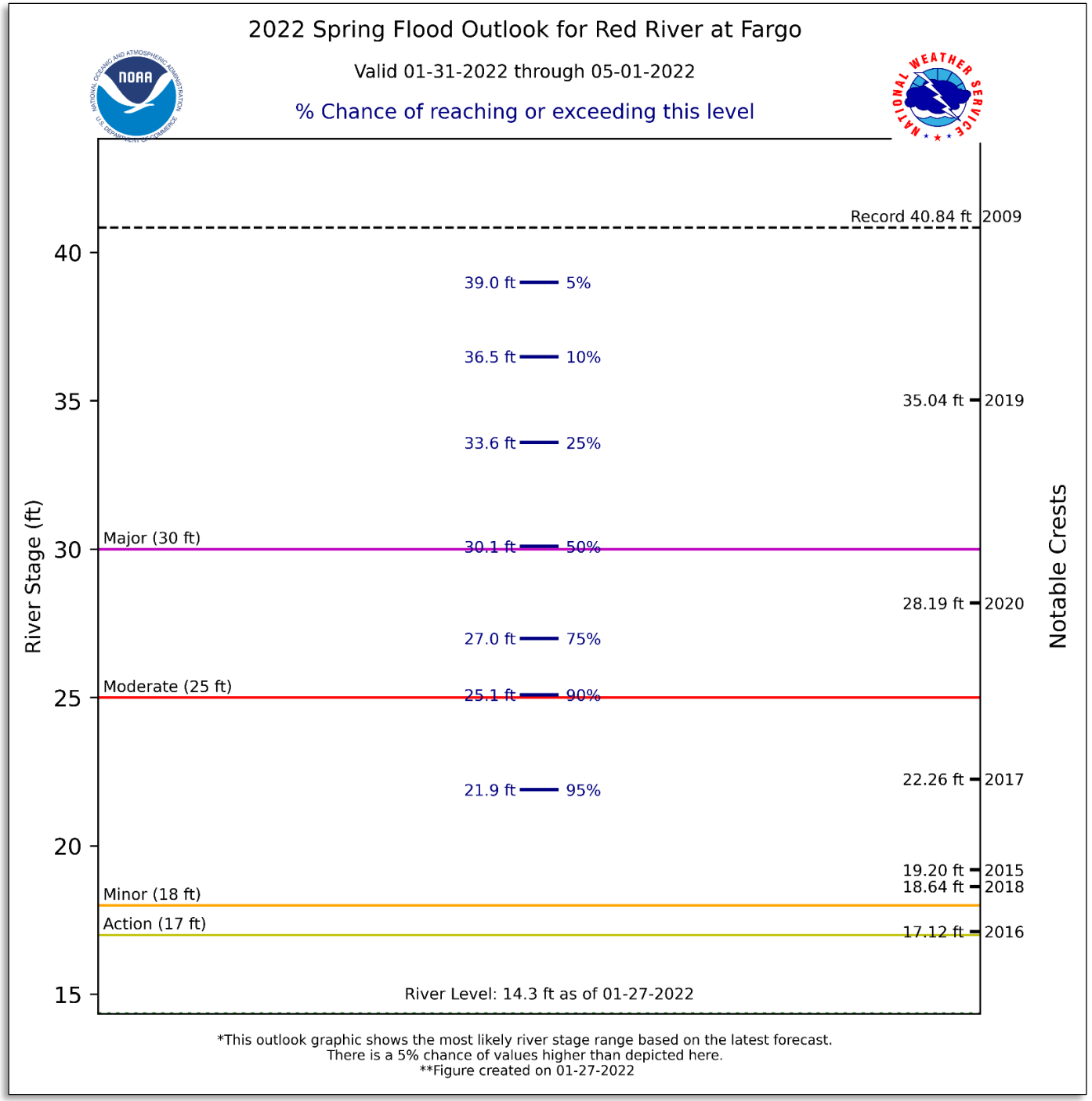
www.weather.gov/fgf/PFOS

PFOS: Probabilistic Flood Outlook Summary

Please provide feedback:

amanda.lee@noaa.gov
or
Survey link from website

www.weather.gov/fgf/PFOS

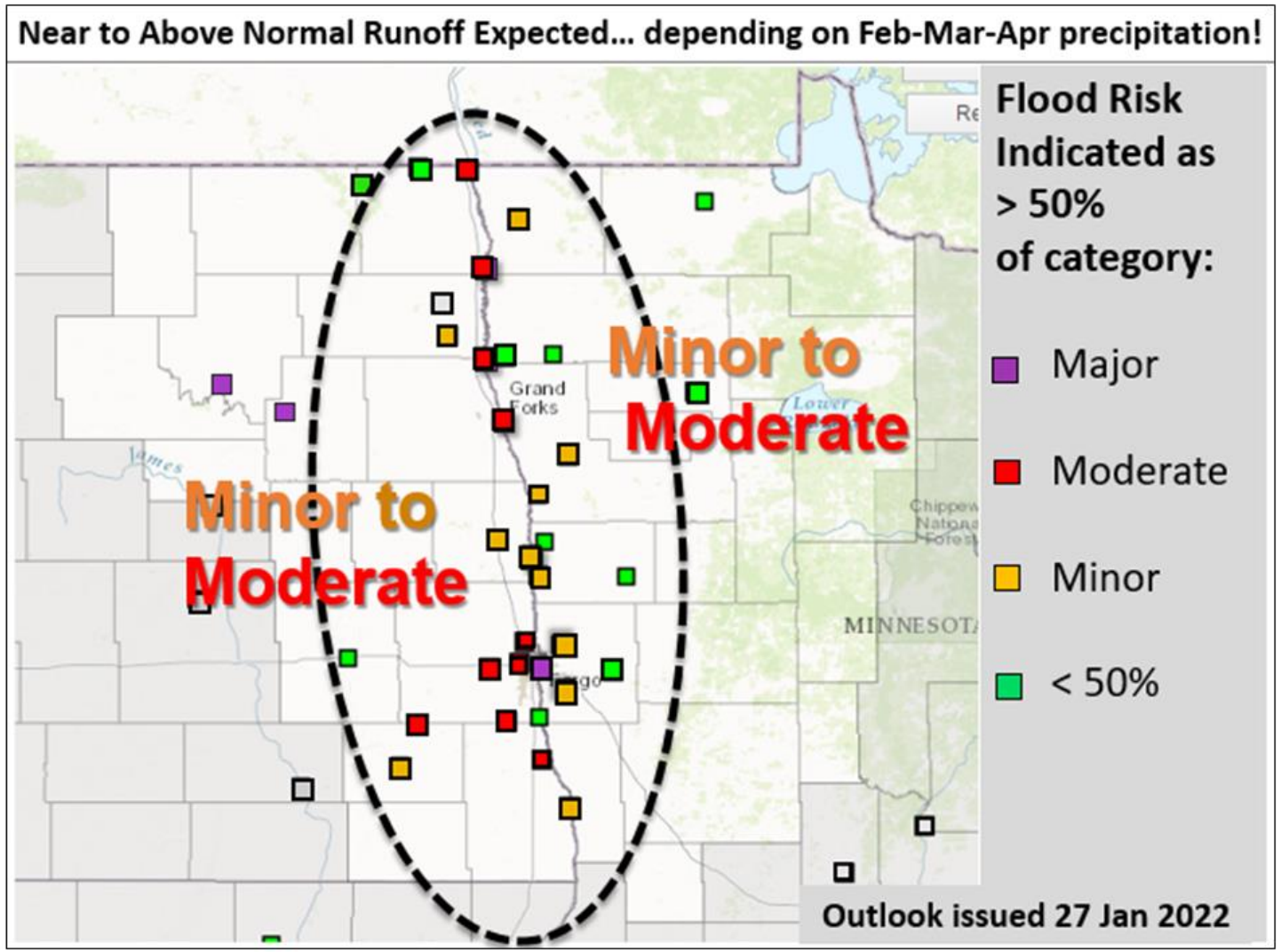


Bottom Line up Front:

- Risk for ***significant flooding*** is near to slightly higher than historic*.
- ***Minor to moderate flooding*** is the main threat…for now.
  - Near normal soil moisture and base streamflow
  - Near normal to above normal snowpack/snow water content
- February/March/April climate outlook trends from colder than normal to equal chances of below/normal/above temperatures and precipitation.

*Refers to Conditional Risk (this year) versus Historical Risk

Flood Risk by Category at River Forecast Points



Future 2022 Probabilistic Outlooks:

- Thursday, February 10th
- Thursday, February 24th
- Thursday, March 10th

Same day for all text, graphics, and webinars

Contact the NWS Grand Forks office 24/7:

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